



GOVERNMENT OF KERALA

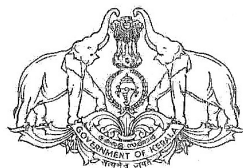


# **EVALUATION STUDY ON SOIL CONSERVATION IN KERALA 2017-18**

DEPARTMENT OF ECONOMICS AND STATISTICS, KERALA

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**Government of Kerala**

# **Evaluation Study on Soil Conservation in Kerala 2017-18**

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**DEPARTMENT OF ECONOMICS & STATISTICS  
KERALA  
2020**



## PREFACE

*The peculiarity of rainfall and topography of the state, soil conservation assumes importance in our planning to maintain sustainability in soil health by preventing soil erosion and fertility loss. Heavy soil erosion results in the loss of fertility and moisture content of the earth's surface and low rate of agricultural production. The State Government has been implementing various soil conservation steps and measures through the soil survey and soil conservation Department, Local Bodies, etc., for maintaining the fertility and moisture content of the surface soil.*

*The Evaluation study of soil conservation schemes has been done by the Directorate of Economics and Statistics for all districts except Wayanad. This report relates to the survey results of 13 schemes completed by the soil survey and Soil Conservation Department. The field survey was conducted during the agricultural year 2017-2018 by the Statistical Investigators under the supervision of the Research Officer and Deputy Director in the District Offices. The schemes implemented and completed prior to three years from period of survey are taken up for study so that full benefit of the scheme could be evaluated and assessed. This evaluation study results may be much of use to Administrators, Statisticians, Research Scholars, Agricultural Geologists and others interested in the subject.*

*I acknowledge my thanks to the staff of Soil Survey and Soil Conservation Department and Local Bodies for their valuable suggestion and whole hearted co-operation for the successful conduct of the survey in the state.*

Thiruvananthapuram,  
10.08.2020

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## **CHAPTER – I**

### ***1.1 Introduction***

Fertile soil leads to better harvest which helps to meet our most basic needs. Those living in countries with healthy soil are properly nourished. So the conservation of soil is one of the important matter in a country.

Soil conservation includes not only control over erosion but all those measures like correction of soil defects, proper crop rotations, and irrigations etc. which aim at maintaining the productivity of the soil at high level. In this sense, soil conservation is closely allied to improvement of land use in general. Considering the importance of soil conservation our plan provisions enhanced for optimizing the use of land resources. An evaluation study in this front can be helpful for developing much more suitable conservation measures.

### ***1.2 Objectives and methodology***

The main objectives of the evaluation study are:

1. To assess the benefit of the programme particularly in relation to the cultivation of seasonal and perennial crops.
2. To throw light on various aspects like cost benefit analysis, production potential etc.
3. To estimate the extent of additional area brought under cultivation consequent on the implementation of the programme.



4. To study the effects of the work carried out by the Soil Conservation Department in this direction.

For this, schemes were selected which were executed three years prior to the survey i.e. during 2014-15 in the State by the Soil Survey and Soil Conservation Department. The study covered all the districts of the State except Wayanad . The list of beneficiaries under each scheme is collected from the implementing Department. The holdings are stratified into four strata.

Holdings with less than 1 acre	- Stratum I
Holdings with 1 acre or more but less than 3 acres	- Stratum II
Holdings with 3 acre or more but less than 5 acres	- Stratum III
Holdings with 5 acres and above	- Stratum IV

### ***1.3 Selection of Scheme & beneficiaries***

First of all, one scheme is selected which were executed three years prior to the survey; i.e, during the year 2014-15; In the absence of such schemes which can be selected prior to the year concerned. The list of schemes is collected from the District Soil Conservation Office and from which one is selected using simple random sampling method.

All beneficiaries are selected for detailed survey. For comparison 20% of the total beneficiaries are also selected from the outside the project area, where the soil conservation works are not carried out under any scheme.



## **1.4 DISTRICT WISE SCHEMES**

### **1. Thiruvananthapuram**

#### ***Aroor watershed RIDF XIV.***

It was commenced in 2010 and completed in 2014, located in Kilimanoor Panchayat, Kilimanoor Block and Chirayinkeezhu Taluk. The aim of the scheme was the improvement of environmental, ecological and economic development status of the people by implementing scientific and planned watershed measures. The total implemented area of the project is 354.82 Ha. Number of Beneficiaries compared to other watershed schemes, it has more number of beneficiaries, ie 562; so as the corresponding increase in the number of control plots, i.e. 112 in numbers.

### **2.Kollam**

#### ***Vadakodu Watershed-RIDF-17***

Total area of the Vadakodu watershed project is 236.8 Ha of land and the treated area is 160.290 with 184 beneficiaries. The scheme started in 2012 and completed in 2015. The stipulated area located in Elamadu and Ummannoor Panchayat in Vettikkavala Block, Kottarakkara Taluk, Kollam Dist.

### **3.Pathanamthitta**

#### ***Vettor watershed.***

It is implemented in Kozhencheri Taluk of Pathanamthitta District and the scheme consists of 480 Ha and the implemented area is 136.120 Ha. with 314 beneficiaries started in 2009 with an aim of procurement of farmers who hired in the northern side of the Irumpathod which reach in Achankovilar after flowing 11330 m and ends in 2014 . The main cultivation in this region are Paddy, Tapioca, Plantain,



Betal leaves, Arecanut, Pepper, Rubber and Coconut. The goal of the scheme was to save from the agriculture loss due to flood and drought.

#### ***4. Alappuzha***

##### ***Muttattimala watershed.***

Muttattimala watershed scheme was started in 2010 and completed in 2015. Major parts of the Mulakuzha Grama Panchayat in Chengannur Taluk, Alappuzha district is included in the scheme which consist of 408 beneficiaries in 318.44 Ha. Unscientific way of farming and the lack of activity to control soil erosions lead to the scarcity of water even though these regions are level zed with 300 cm rainfall. So the Agriculture production and productivity are in low range. After this scheme implementation the changes in all fields can be seen.

#### ***5. Kottayam***

##### ***Choorakkadu water shed-1***

Choorakkadu water shed scheme started in 2011 the treated area stipulated as 301.410 Ha of land; located in Koruthod Grama Panchayat in Kanjirapally Block Kanjirapally Taluk, Kottayam district. 190 Beneficiaries are included in the scheme.

#### ***6. Idukki***

##### ***Azhangad Meloram RIDF- XIX***

The Azhangad Meloram watershed implemented in Kokkayar Grama Panchayath, Azhutha Block Peerumedu Taluk, Idukki District. The area of the project is 597.06 Ha of land and the treated area is 499.14 with the total beneficiaries 220, which is started in 2014 and completed in 2015.



## **7.Eranakulam**

### ***Pannaparathodu Watershed project***

Pannaparathodu watershed scheme in Manjalloor Grama Panchayat in Moovattupuzha Taluk, Eranakulam district. Pannaparathodu watershed scheme was implemented during 2010 to 2015 comprising of 172 beneficiaries with an area of 140.380 Ha of land.

## **8.Thrissur**

### ***Plachithodu water shed***

The geographical area of Plachithod watershed is 2200 Ha. The scheme area is stipulated for the implementation of the project in 355.670 Ha and which comprises of 113 beneficiaries. It is started in 2012 with an aim to control drought and soil erosion and completed in 2015.

## **9.Palakkad**

### ***Vazhukkaparathode flood management.***

It is a project based on flood management implemented in Parali village, Parali Panchayat, Palakkad Block, Palakkad District comprising of 245 beneficiaries covered 182.81 Ha of land. The project had taken 3 yrs to complete till 2015.

## **10. Malappuram**

### ***Chekkunnu Watershed RIDF XIII.***

This scheme started in 2010 and completed in 2014 and which is located in Uranghathira Grama Panchayat , Areacode Block , Eranad Taluk, Malapurram



District. It is comprised of the total treated area is 336.62 Ha involves 224 beneficiaries.

### ***11.Kozhikkode***

#### ***Mavullachalil Watershed Scheme.***

This scheme is implemented in Valayam and Vanimel Grama Panchayath in Thuneri Block, Vadakara Taluk, Kozhikde District. The treated area is 67.31 Ha of lands comprising of 77 beneficiaries. Different activities were involved in the scheme to conserve the soil and safe guarding the water sources.

### ***12.Kannur***

#### ***Madappurathodu watershed RIDF-17***

Madappurathodu watershed scheme was started in 2012 and completed during 2014-15 comprising of 125 beneficiaries in 167.33 Ha of land. It is located in Vellarvally Tholampura village in Peravoor Block in Kannur district.

### ***13.Kasargod***

#### ***Muttomkadavu water scheme***

Muttomkadavu water shed is situated in Balal, West Eleri and East Eleri Grama Panchayat in Vellarikundu Taluk, Kasargod District. The Scheme area treated is 545.35 Ha and 274 beneficiaries. The tenure of the project was 4 years starts from 2011 and completed in 2015. The project achieved 100% of physical as well as financial progress.

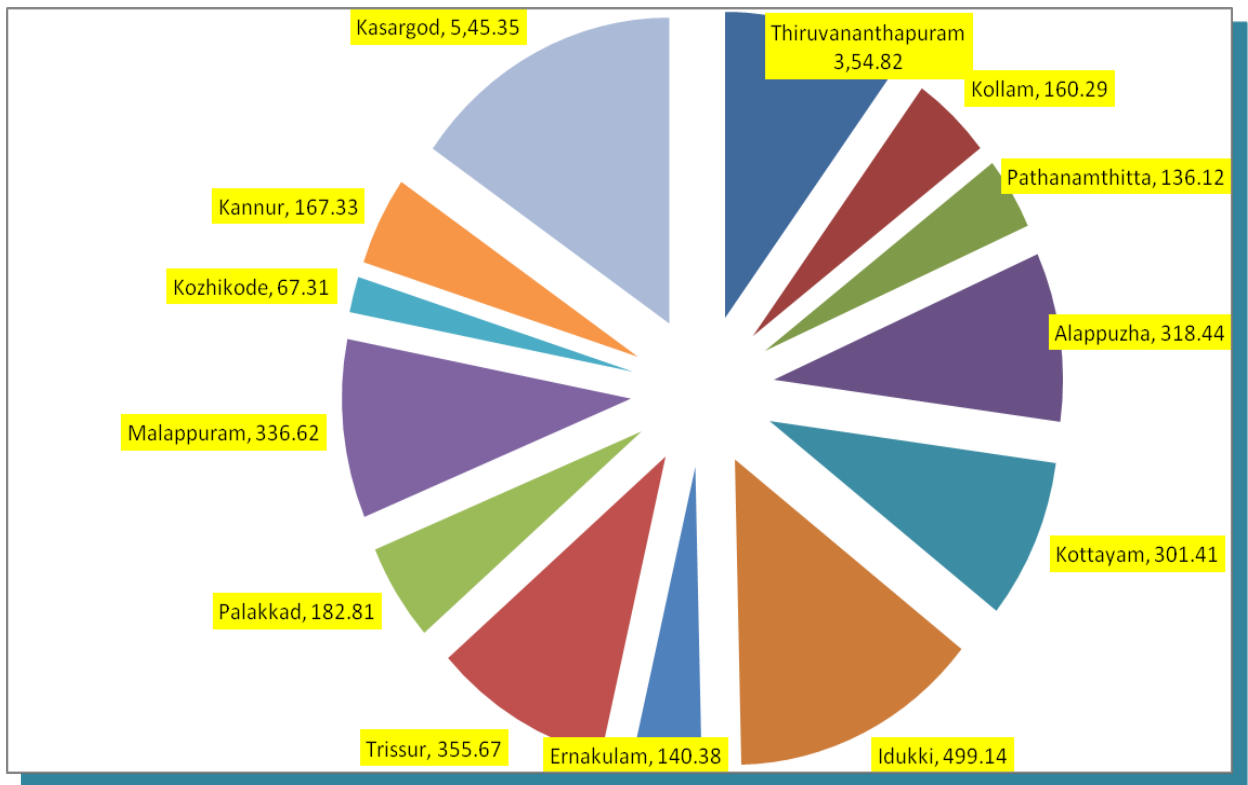


**Table-1.1 List of selected schemes**

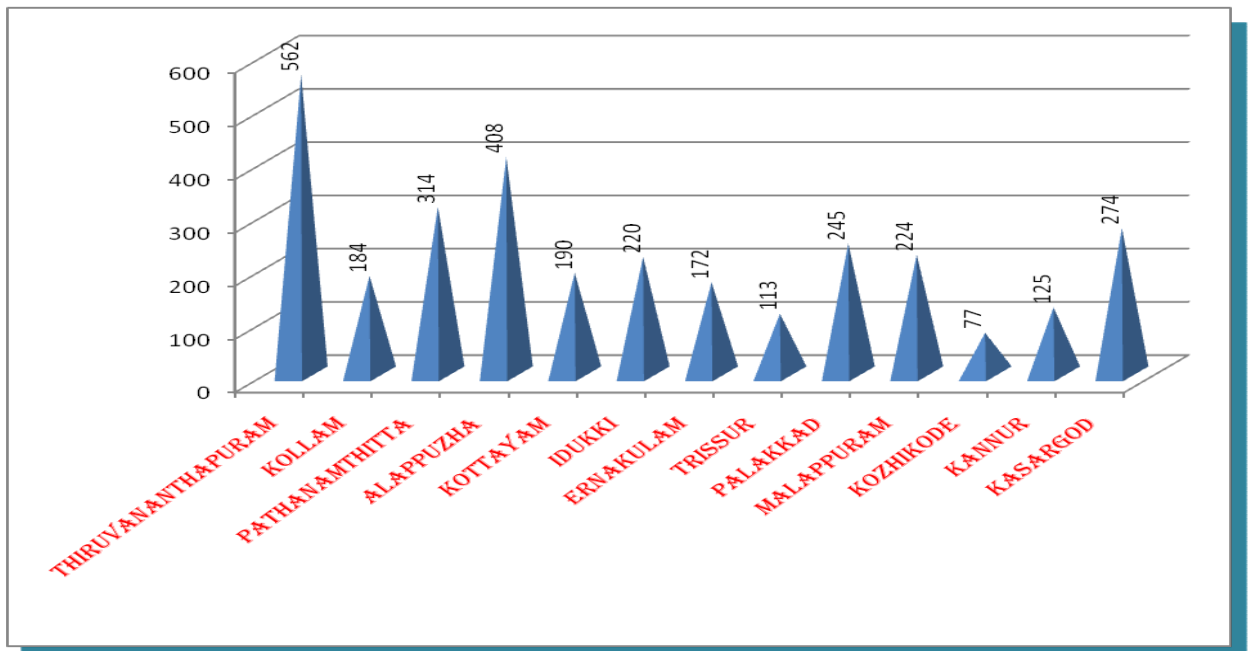
<i><b>Sl No</b></i>	<i><b>District Name</b></i>	<i><b>Name of Selected Scheme</b></i>	<i><b>Total Area</b></i>	<i><b>No of beneficiaries</b></i>	<i><b>No of control plots</b></i>
<b>1</b>	Thiruvananthapuram	Aroor Watershed RIDF-14	354.82	562	112
<b>2</b>	Kollam	Vadakodu Watershed RIDF XVII	160.29	184	36
<b>3</b>	Pathanamthitta	Vettoor Watershed project RIDF-XIV	136.12	314	63
<b>4</b>	Alappuzha	Muttattimala Watershed scheme	318.44	408	81
<b>5</b>	Kottayam	Choorakkadu Watershed-1	301.41	190	38
<b>6</b>	Idukki	Azhangad-Meloram Watershed RIDF XIX	499.14	220	44
<b>7</b>	Ernakulam	Panapparathodu Watershed project	140.38	172	35
<b>8</b>	Trissur	Plachithode Watershed XVII	355.67	113	23
<b>9</b>	Palakkad	Vazhukkapparathode flood management.	182.81	245	49
<b>10</b>	Malappuram	Chekkunnu Watershed RIDF XIII	336.62	224	49
<b>11</b>	Kozhikode	Mavullachalil RIDF	67.31	77	16
<b>12</b>	Kannur	Madappurathodu Watershed RIDF XVII	167.33	125	25
<b>13</b>	Kasargod	Muttomkadavu Watershed scheme	545.35	274	55
	<b>Total</b>		<b>3565.69</b>	<b>3108</b>	<b>626</b>



**Graph 1.1 Districtwise Implemented Area in Hectors**



**Graph 1.2 Districtwise No.of Beneficiaries**

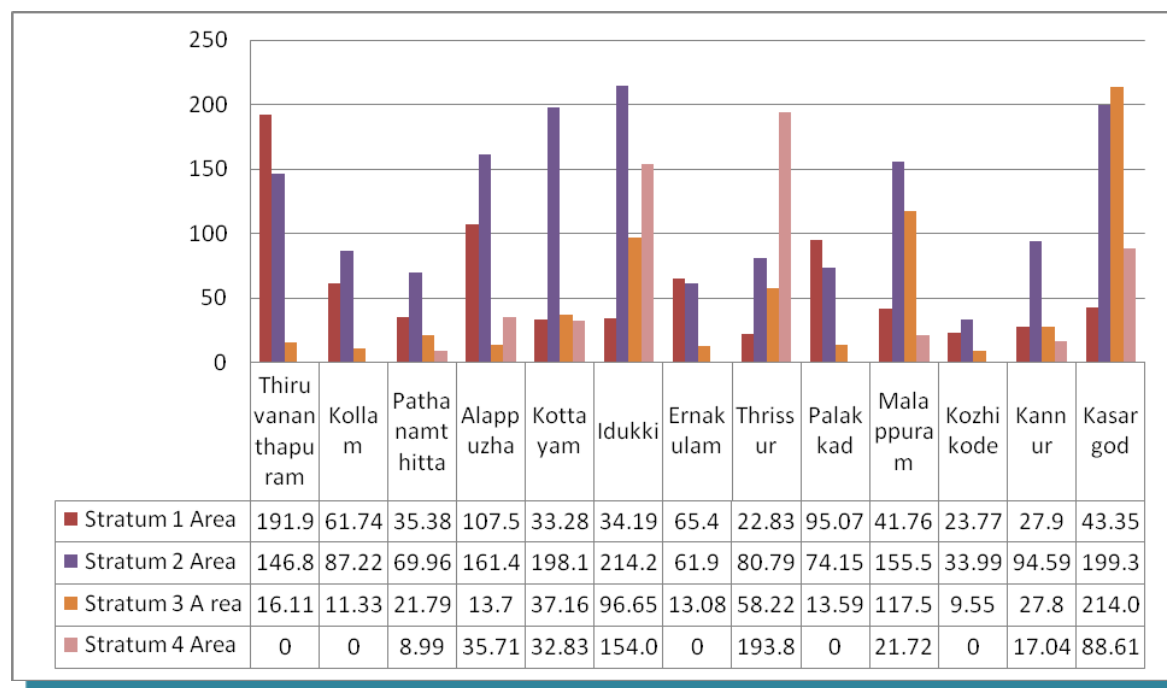




**Table-1.2 Statement showing stratum wise distribution of selected beneficiaries (area in acres)**

Sl no	Districts	No of schemes selected	Stratum 1		Stratum 2		Stratum 3		Stratum 4		Total	
			No:	Area	No:	Area	No:	Area	No:	Area	No:	Area
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	1	458	191.910	99	146.800	5	16.110		0.000	562	354.820
2	Kollam	1	121	61.740	60	87.220	3	11.330		0.000	184	160.290
3	Pathanamthitta	1	210	35.380	89	69.960	13	21.790	2	8.990	314	136.120
4	Alappuzha	1	297	107.550	102	161.480	4	13.700	5	35.710	408	318.440
5	Kottayam	1	58	33.280	117	198.135	10	37.165	5	32.830	190	301.410
6	Idukki	1	52	34.191	122	214.259	26	96.650	20	154.040	220	499.139
7	Ernakulam	1	128	65.400	40	61.900	4	13.080		0.000	172	140.380
8	Thrissur	1	50	22.830	45	80.790	16	58.220	2	193.830	113	355.670
9	Palakkad	1	191	95.070	50	74.150	4	13.590		0.000	245	182.810
10	Malappuram	1	87	41.760	98	155.590	35	117.550	4	21.720	224	336.620
11	Kozhikode	1	49	23.770	25	33.990	3	9.550		0.000	77	67.310
12	Kannur	1	53	27.900	63	94.590	7	27.800	2	17.040	125	167.330
13	Kasargod	1	80	43.350	123	199.310	57	214.080	14	88.610	274	545.350
Total		13	1834	784.131	1033	1578.174	187	650.615	54	552.770	3108	3565.690

**Graph 1.3 District wise - Stratum wise selected beneficiaries**

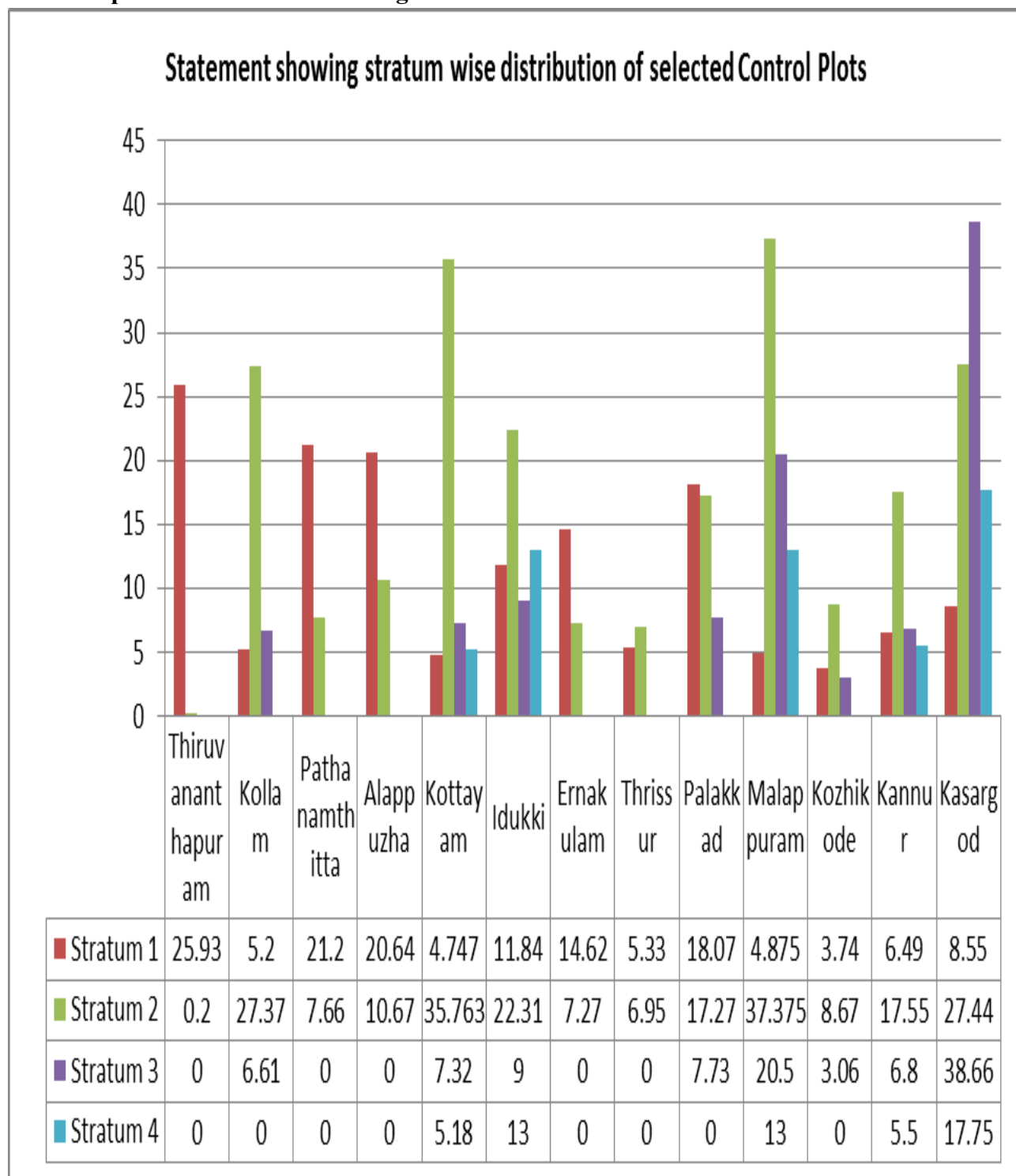




**Table- 1.3 Statement showing stratum wise distribution of selected Control Plots**

Sl no	Districts	No of schemes selected	Stratum 1		Stratum 2		Stratum 3		Stratum 4		Total	
			No:	Area	No:	Area	No:	Area	No:	Area	No:	Area
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	1	111	25.930	1	0.200		0.000		0.000	112	26.13
2	Kollam	1	15	5.200	19	27.37	2	6.610		0.000	36	39.18
3	Pathanamthitta	1	54	21.2	9	7.66		0.000		0.000	63	28.86
4	Alappuzha	1	73	20.64	8	10.67		0.000		0.000	81	31.31
5	Kottayam	1	12	4.747	23	35.763	2	7.320	1	5.180	38	53.01
6	Idukki	1	25	11.84	14	22.310	3	9.000	2	13.000	44	56.15
7	Ernakulam	1	29	14.620	6	7.270		0.000		0.000	35	21.89
8	Thrissur	1	18	5.330	5	6.950		0.000		0.000	23	12.28
9	Palakkad	1	35	18.070	11	17.270	3	7.730		0.000	49	43.07
10	Malappuram	1	20	4.875	20	37.375	7	20.5	2	13.000	49	75.75
11	Kozhikode	1	10	3.740	5	8.670	1	3.060		0.000	16	15.47
12	Kannur	1	10	6.490	12	17.55	2	6.800	1	5.500	25	36.34
13	Kasargod	1	23	8.550	19	27.440	10	38.66	3	17.750	55	92.4
Total		13	435	151.232	152	226.498	30	99.68	9	54.430	626	531.84



**Graph -1.4 Statement showing stratum wise distribution of selected Control Plots**



The total number of beneficiaries comes to 3108. About 59% of the beneficiaries are having holding less than one acre, 33.24% are having holdings one acre or more but less than 3 acres, 6.02% are having holding 3 acre or more but less than 5 acres and 1.74% of the beneficiaries are having holdings of more than 5 acres. In order to compare the benefits of the implementation of Soil Conservation Programmes, control plots (20% of the total of beneficiaries) were also selected. Its distribution is 69.49%, 24.28%, 4.79% and 1.44% respectively under Stratum I, II, III and IV.

Following schedules were used for collecting the details from beneficiary plots and control plots.

Schedule I	-	List of selected beneficiaries
Schedule II	-	Detailed study of the selected beneficiaries
Schedule III	-	List of control plots
Schedule IV	-	Detailed enumeration of the control plots
Table A		Basic facts about the area & the people in General

### ***1.5 Problems of Soil Erosion***

Soil erosion means the disappearance of the topsoil by the action of wind and water. Ultimately soil erosion leads the desertification of land. Degradation of natural resources has led to many indirect damages, such as increasing extent of wasteland, soil erosion, land sliding, etc. all these cumulatively or independently affected agricultural area or reduce agricultural productivity. Unlike other parts of the country, Kerala has some unique land form related aspects such as over 90% of the geographical area is either in midland or high land category. The average rate of soil erosion in the country, to the



tune of 16.3tons ha/yr – has been alarming and has to be checked. In hilly areas, the rate is much higher, i.e. about 30 to 50 t/ha/yr/, considering that about 5cm to 10 cm of the top soil (ranging from 0.05m to 0.1m depth) is being lost every year due to land management practices. It has been estimated 9-5 lakh hectares of cultivated land in the State is having soil erosion problems.

### ***1.6 Responsibility for prevention of erosion***

Land which is one of the precious gifts of the nature embodies soil, water and associated flora and fauna involving the total ecosystem. The topography of the land plays the most important role in soil erosion. Kerala is a narrow strip of land (width varies from 15 Km to 120 Km) situated on the Western Slopes of the Western Ghats (the Sahyadri). The very steep slopes facilitate quick run off of the rainfall resulting in low time of concentration poor ground water recharge. This high velocity of the surface flow causes soil displacement and movement. The surface soil gets washed away along with the running water. The major portion of the state is laterite and as such is more prone to erosion. The different forms of soil erosion cause huge damage to Kerala's economy every year and reported casualties every year due to landslides in monsoon season.

### ***1.7 Methods of Soil Conservation Programme***

Soil Conservation practices are mainly grouped into two categories viz. Agronomical and Engineering measures. Agronomic measures are comparatively less costly such as contour ploughing / optimal fertilizing, organic farming, etc. Engineering



measures include contour bunding , land leveling, construction of check dams and water harvesting structure, etc. At present various watershed programmes are being implemented in the state for effective preservation and management of the natural resources.

### ***1.8 Land Use Particulars of the State***

There has been a significant change in the land use of the state over the years. On many occasions the change is adversely affecting the environment by way of intensified soil erosion, water logging, conversion of paddy lands, etc. are some of the examples. Cultivation of very steep lands without adopting scientific conservation practices lead to heavy soil erosion. Use of chemicals on a large scale for agricultural productions leaves dangerous quantities of the residues in the soil and the water sources.



## **Chapter – II**

### ***2.1 Impact of Soil Conservation Programme on Land Use and Crop Pattern***

Before 1994-95, soil conservation programme was executed by Department of Agriculture/Soil and Water conservation, etc. There was increased employment to rural people due to soil and water conservation works and this improved income of people and reduced migration of labour from these places to outside. Soil and water conservation structures in arable and non-arable lands reduced soil erosion, soil loss, run-off water, etc. and increased rainwater infiltration, ground water table, surface storage, cropping intensity, productivity of crops, etc. As long as works were carried out based on funding by Government and subsidies provided for supporting income generating enterprises, there was positive impact.

After 1994-95, there was a proposal from the Government that people should contribute 5-10% or more towards soil and water conservation works. Farmers contributed in some of the watersheds based on the direct benefits derived from such activities;

Soil can be well maintained through bunding (mechanical and mechanical-cum-vegetative barriers), deep ploughing, levelling, smoothening, etc. Bunding was accepted by farmers to strengthen existing bunds without any obstruction in their plot. Moisture conservation on measures increased yield magically.

Farmers in different parts reported that the fact that the sustainability of agriculture is only possible by soil and water conservation measures. They also reported that soil erosion can be minimized and irrigation potentials can be improved through soil and water



conservation measures. In addition, vegetation covering the soil is a must for minimizing soil loss even further.

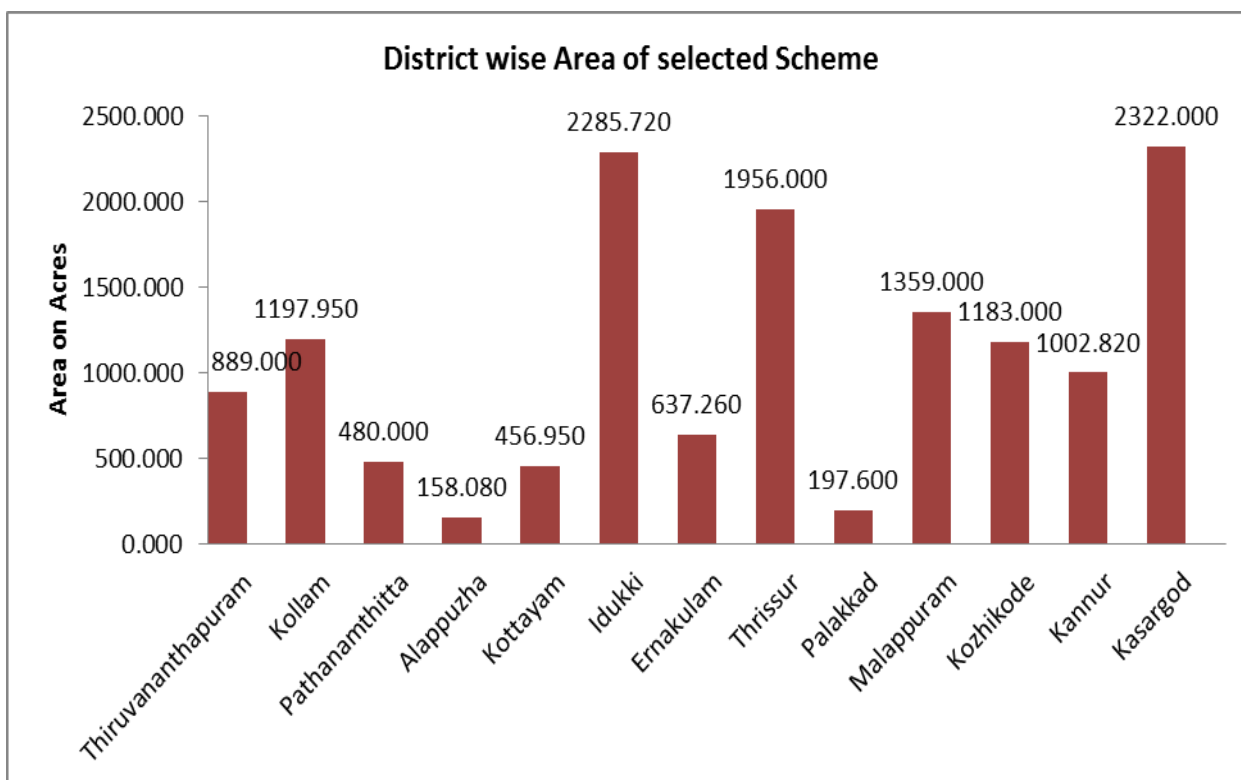
Table 2.1 gives number of beneficiaries selected in each district and cost of the selected schemes. Also gives total area covered.

**Table-2.1 District wise details of area, cost and number of beneficiaries**

Sl No:	District	Area(Acres)	Cost(Rs)	Number of beneficiaries	
				Total	Selected
1	2	3	4	5	6
1	Thiruvananthapuram	889.000	5471667.00	562	562
2	Kollam	1197.950	7300000.00	184	184
3	Pathanamthitta	480.000	6494746.00	314	314
4	Alappuzha	158.080	8900000.00	408	408
5	Kottayam	456.950	7315590.00	190	190
6	Idukki	2285.720	15169000.00	220	220
7	Ernakulam	637.260	2030000.00	172	172
8	Thrissur	1956.000	7299985.00	113	113
9	Palakkad	197.600	4523320.00	245	245
10	Malappuram	1359.000	8873721.00	224	224
11	Kozhikode	1183.000	7424000.00	77	77
12	Kannur	1002.820	10110000.00	125	125
13	Kasargod	2322.000	12331556.00	274	274
<b>Total</b>		<b>14125.38</b>	<b>103243585</b>	<b>3108</b>	<b>3108</b>



**Graph -2.1 District wise Area of selected Scheme**



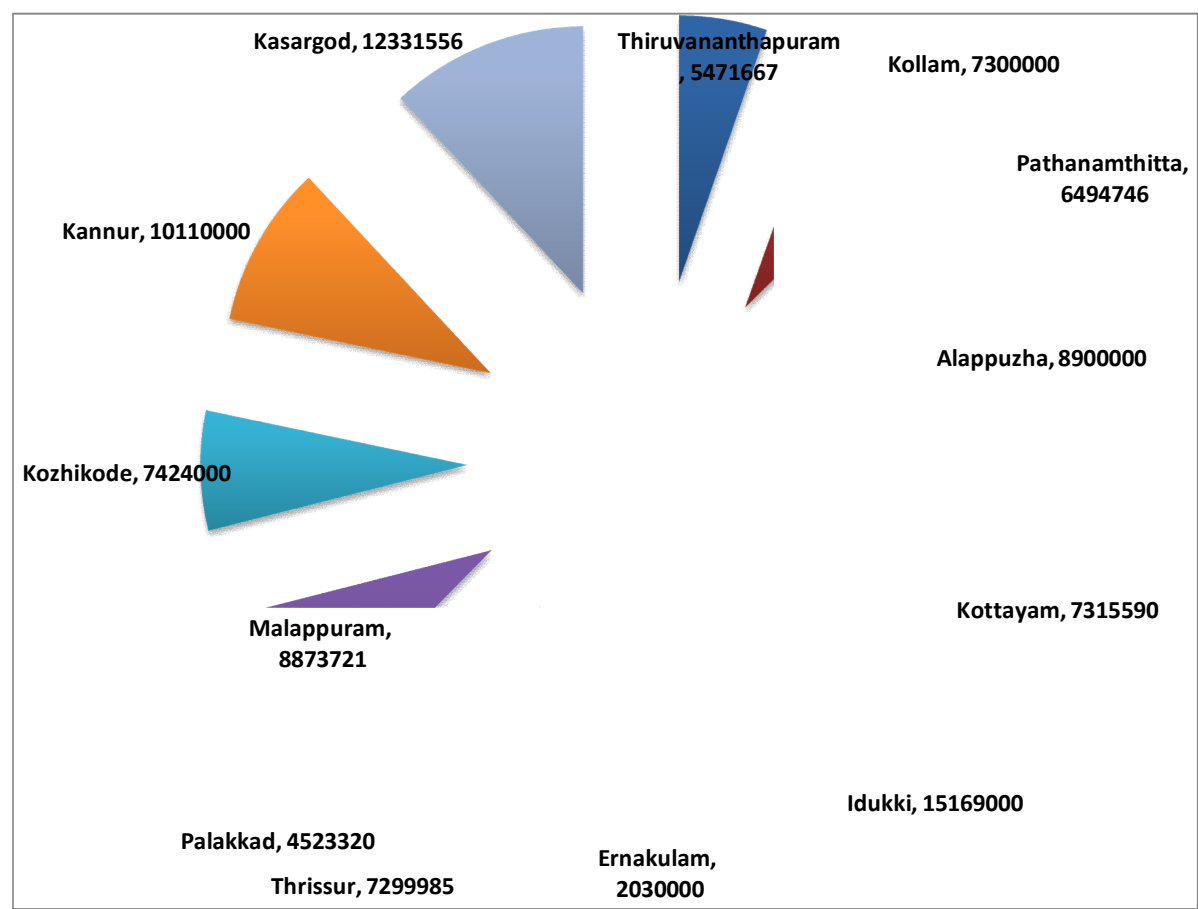
## ***2.2 Cost Benefit Analysis in the soil Conservation Programme***

Cost benefit analysis is a method that can be used to evaluate the effects of goods produced by agriculture on the total welfare of the society. The effects are made to values the cost and benefits due to different policy measures in monetary terms .Improving agricultural productivity across the sectors are important in order to improve the income of the farmers.

The better productivity through the efficient utilization of resources reduce the cost and realize the fair prices for the outputs . In this study it investigates cost and benefits associated with adaptation approaches employed by farmers with various systems and methods expressing in monetary terms and identify the most effective and economic option based on general information and responses of farmers.



**Graph -2.2 District wise details of Cost in Rupees**





**Table-2.2 District wise details of number of beneficiaries in General, SC & ST Separating APL & BPL in scheme area and number of farmers in control plot**

SI No	District	upper/middle lower layer	scheme area								control plots							
			General		SC		ST		Total		General		SC		ST		Total	
			APL	BPL	APL	BPL	APL	BPL	APL	BPL	APL	BPL	APL	BPL	APL	BPL	APL	BPL
1	Thiruvananthapuram	(1)	177	2	0	5	0	0	177	7	29	6	0	3	0	0	29	9
		(2)	220	2	0	0	0	0	220	2	30	7	0	0	0	0	30	7
		(3)	151	4	0	1	0	0	151	5	32	5	0	0	0	0	32	5
2	Kollam	(1)	22	87	6	16	0	0	28	103	5	13	2	5	0	0	7	18
		(2)	7	30	2	6	0	0	9	36	2	5	0	1	0	0	2	6
		(3)	3	4	0	1	0	0	3	5	1	1	0	1	0	0	1	2
3	Pathanamthitta	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		(2)	163	117	4	30	0	0	167	147	32	26	0	5	0	0	32	31
		(3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Alappuzha	(1)	18	6	2	7	0	0	20	13	16	2	0	0	0	0	16	2
		(2)	212	74	12	28	0	0	224	102	37	6	0	8	0	0	37	14
		(3)	35	11	1	2	0	0	36	13	10	2	0	0	0	0	10	2
5	Kottayam	(1)	79	29	0	0	0	82	79	111	18	8	0	0	0	12	18	20
		(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		(3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Idukki	(1)	74	40	6	5	0	7	80	52	17	2	1	0	0	0	18	2
		(2)	36	43	0	7	0	2	36	52	10	10	0	3	1	0	11	13
		(3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Ernakulam	(1)	25	9	0	9	0	5	25	23	5	1	0	2	0	1	5	4
		(2)	29	4	0	1	0	1	29	6	7	0	0	0	0	0	7	0
		(3)	65	15	0	6	0	3	65	24	14	2	0	3	0	0	14	5
8	Thrissur	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		(2)	95	18	0	0	0	0	95	18	21	2	0	0	0	0	21	2
		(3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Palakkad	(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		(3)	202	12	20	11	0	0	222	23	41	4	1	3	0	0	42	7
10	Malappuram	(1)	129	9	0	0	0	0	129	9	13	10	1	0	1	3	15	13
		(2)	44	24	0	1	0	0	44	25	9	6	0	0	1	2	10	8
		(3)	12	3	0	0	0	2	12	5	2	1	0	0	0	0	2	1
11	Kozhikode	(1)	4	21	0	1	0	0	4	22	3	2	0	2	0	0	3	4
		(2)	12	10	0	3	0	0	12	13	2	1	0	0	0	0	2	1
		(3)	11	13	0	2	0	0	11	15	4	2	0	0	0	0	4	2
12	Kannur	(1)	3	25	0	0	0	0	3	25	1	4	0	0	0	1	1	5
		(2)	21	72	0	0	0	0	21	72	4	15	0	0	0	0	4	15
		(3)	0	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0
13	Kasargod	(1)	203	57	0	0	2	12	205	69	0	0	0	0	0	0	0	0
		(2)	0	0	0	0	0	0	0	0	41	13	0	0	0	1	41	14
		(3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



**Table-2.3 Details of Water Resources in Scheme Area**

<b>District Name</b>	<b>Scheme Name</b>	<b>Number of Ponds</b>	<b>Number of Wells</b>
<b>Thiruvananthapuram</b>	Aroor Water Shed, RIDF-14	3	386
<b>Kollam</b>	Vadakodu watershed RIDF-17	25	79
<b>Pathanamthitta</b>	Vettoor watershed	6	224
<b>Alappuzha</b>	Muttatimala watershed	81	294
<b>Kottayam</b>	Choomakkadu watershed	0	96
<b>Idukki</b>	AzhangadMeloram Watershed RIDF XIV	6	123
<b>Ernakulam</b>	Panapparathodu Watershed Project	8	35
<b>Thrissur</b>	Plachithoduneerthadapadhathi	6	108
<b>Palakkad</b>	Vazhakkaparavellapokkanivaranap adhathi	5	74
<b>Malappuram</b>	Chekkunnu watershed RIDF X111	2	52
<b>Kozhikode</b>	Mavullachalil	0	41
<b>Kannur</b>	Madappurathidu Watershed	6	128
<b>Kasargod</b>	Muttoamkadavu watershed project	13	135
<b>TOTAL</b>		<b>161</b>	<b>1775</b>



**Table-2.4 Water level in wells during April/May of beneficiaries in scheme area**

District	Before			After			Control Plot		
	Below 1/2	1/2-1	1-2	Below 1/2	1/2-1	1-2	Below 1/2	1/2-1	1-2
Thiruvananthapuram	317	69	0	309	75	2	31	12	6
Kollam	43	5	31	35	8	36	23	0	5
Pathanamthitta	78	140	6	71	145	8	14	31	3
Alappuzha	192	56	46	191	58	45	42	14	2
Kottayam	47	37	12	44	38	14	12	4	5
Idukki	62	45	16	60	46	17	27	3	1
Ernakulam	10	14	11	7	17	11	14	2	5
Thrissur	87	18	3	83	21	4	12	5	0
Palakkad	32	32	10	30	33	11	6	21	3
Malappuram	23	14	15	6	18	28	21	5	2
Kozhikode	18	12	11	14	14	13	5	6	2
Kannur	64	43	21	61	44	23	13	1	1
Kasargod	87	23	25	85	28	22	19	15	6

Table 2.4 Illustrates the water level in wells that have increased remarkably after the soil conservation Scheme. Before the implementation of the schemes of the water level in the wells in Thiruvananthapuram, 69 wells are in the level of 0.5 to 1m and after the Soil Conservation work improvement can be seen; ie. 75 wells shows the same level as 0.5 to 1m. Remarkable changes can be seen in all districts is below 0.5, 0.5 to 1m and 1 to 2 meters.



**Table-2.5 Scarcity of well water in scheme area & in control plot during survey period**

District	Before			After			Control Plot		
	0-1 month	1-2 month	>2	0-1 month	1-2 month	>2	0-1	1-2	>2
Thiruvananthapuram	277	33	76	313	17	56	91	8	13
Kollam	51	13	15	59	8	12	29	4	3
Pathanamthitta	14	25	185	68	84	72	6	3	54
Alappuzha	96	52	146	184	63	47	69	11	2
Kottayam	26	19	51	37	18	41	35	3	0
Idukki	28	42	53	44	36	43	8	2	34
Ernakulam	6	3	26	10	4	21	28	0	7
Thrissur	4	16	88	20	27	61	9	8	6
Palakkad	10	13	51	13	21	40	44	4	1
Malappuram	9	15	28	14	18	20	43	0	6
Kozhikode	12	15	14	12	18	11	11	2	0
Kannur	9	16	103	17	19	92	19	0	6
Kasargod	23	17	95	32	22	81	51	3	0

The table 2.5 describes the scarcity of well water in scheme area and in control plots. Changes can be seen in duration of months of water scarcity in most of the Districts. Even though drastic change cannot be rectified, a remarkable change can be mentioned.



### ***2.3 Land use particulars of Beneficiary Plots***

Table 2.6 shows the land use of particulars of beneficiary plots. In the case of area of cultivation, nominal change can be seen in most of all districts. Pathanamthitta, Palakkad, Kannur and Kasaragod shows no change; Thiruvananthapuram, Kollam, Idukki and Malappuram show more area of cultivation after Soil Conservation works and Alappuzha, Kottayam, Ernakulam and Thrissur show less area after Soil Conservation works. Among these five districts increase in the area of cultivation is only marginal.

Current fallow remains same in Pathanamthitta (01.01), Palakkad (Nil), Kozhikkode (Nil) and Kannur (0.01) . A drastic change can be seen in Thiruvananthapuram and Malappuram districts. The current fallow hike is noted in Kottayam and Ernakulam District. While considering the other use of land five districts namely Pathanamthitta, Palakkad, Malappuram, Kannur and Kasaragod keep the same figure without of any change. Slight variation shows in other districts.

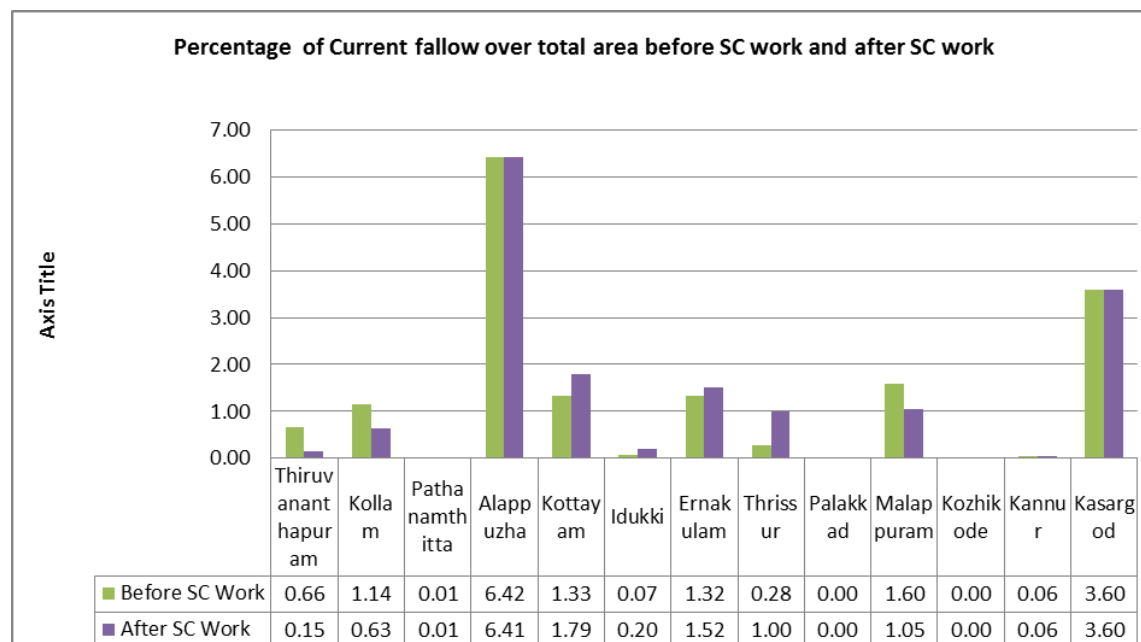


**Table2.6 Land use particulars of Beneficiary Plots**

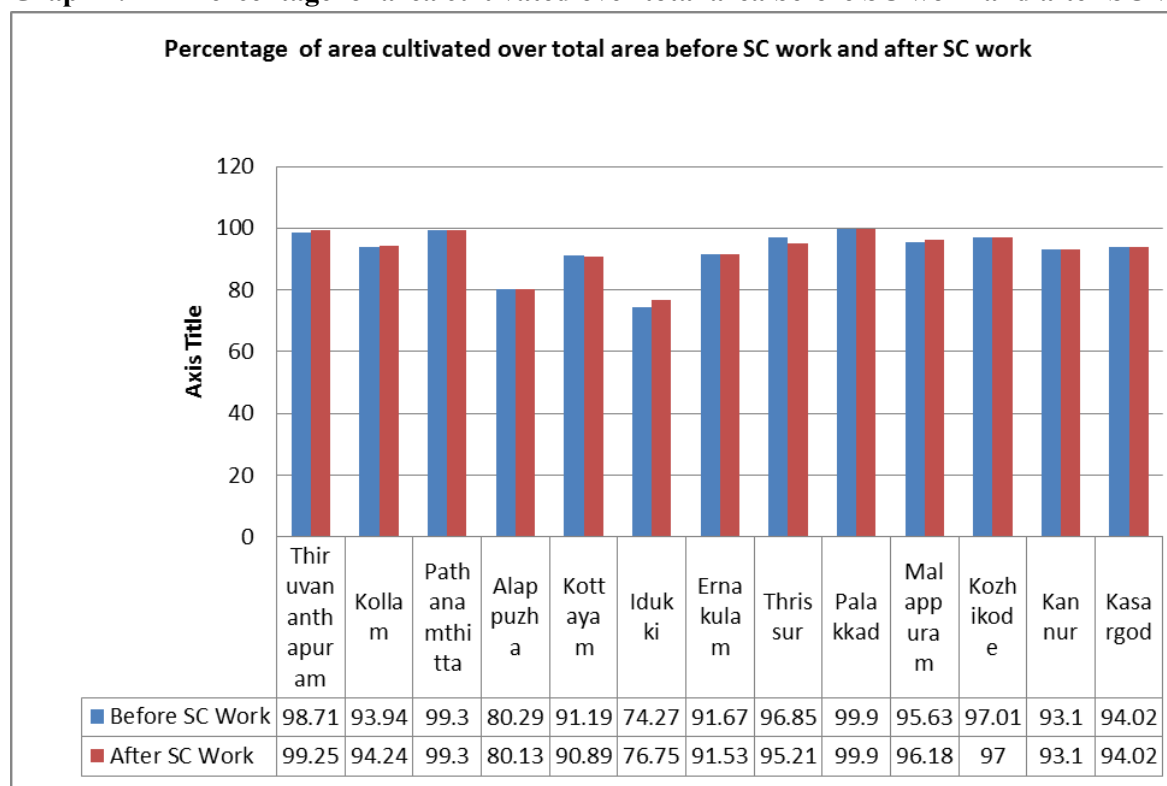
Sl No	Districts	Area Cultivated				Current fallow				Other use				Area not Cultivated				Total			
		Before SC Work		After SC Work		Before SC Work		After SC Work		Before SC Work		After SC Work		Before SC Work		After SC Work		Before SC Work		After SC Work	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Thiruvananthapuram	350.12	98.71	352.15	99.25	2.33	0.66	0.53	0.15	2.15	0.58	1.92	0.54	0.22	0.06	0.22	0.06	354.82	100	354.82	100
2	Kollam	150.58	93.94	151.06	94.24	1.83	1.14	1.01	0.63	7.11	4.44	7.45	4.65	0.77	0.48	0.77	0.48	160.29	100	160.29	100
3	Pathanamthitta	135.17	99.3	135.17	99.3	0.01	0.01	0.01	0.01	0.1	0.07	0.1	0.07	0.84	0.62	0.84	0.62	136.12	100	136.12	100
4	Alappuzha	255.66	80.29	255.17	80.13	20.44	6.42	20.4	6.41	35.03	11	35.56	11.17	7.31	2.3	7.31	2.3	318.44	100	318.44	100
5	Kottayam	274.859	91.19	273.959	90.89	4	1.33	5.4	1.79	13.868	4.6	13.288	4.41	8.682	2.88	8.762	2.91	301.41	100	301.41	100
6	Idukki	370.718	74.27	383.085	76.75	0.33	0.07	1.013	0.2	59.948	12.01	57.503	11.52	68.143	13.65	57.538	11.53	499.139	100	499.139	100
7	Ernakulam	128.69	91.67	128.49	91.53	1.86	1.32	2.14	1.52	6.81	4.85	6.73	4.79	3.02	2.15	3.02	2.15	140.38	100	140.38	100
8	Thrissur	344.47	96.85	338.63	95.21	1	0.28	3.55	1	10.2	2.87	13.49	3.79	0	0	0	0	355.67	100	355.67	100
9	Palakkad	182.63	99.9	182.63	99.9	0	0	0	0	0.18	0.1	0.18	0.1	0	0	0	0	182.81	100	182.81	100
10	Malappuram	321.91	95.63	323.76	96.18	5.38	1.6	3.53	1.05	7.54	2.24	7.54	2.24	1.79	0.53	1.79	0.53	336.62	100	336.62	100
11	Kozhikode	65.3	97.01	65.29	97	0	0	0	0	1.79	2.66	1.8	2.67	0.22	0.33	0.22	0.33	67.31	100	67.31	100
12	Kannur	155.78	93.1	155.78	93.1	0.1	0.06	0.1	0.06	5.07	3.03	5.07	3.03	6.38	3.81	6.38	3.81	167.33	100	167.33	100
13	Kasargod	512.74	94.02	512.74	94.02	19.63	3.6	19.63	3.6	7.34	1.35	7.34	1.35	5.64	1.03	5.64	1.03	545.35	100	545.35	100
Total		3248.627	91.110	3257.914	91.370	56.910	1.600	57.313	1.610	157.136	4.400	157.971	4.430	103.015	2.890	92.490	2.590	3565.689	100	3565.689	100



**Graph 2.3 Percentage of Current fallow over total area before SC work and after SC work**



**Graph 2.4 Percentage of area cultivated over total area before SC work and after SC work**



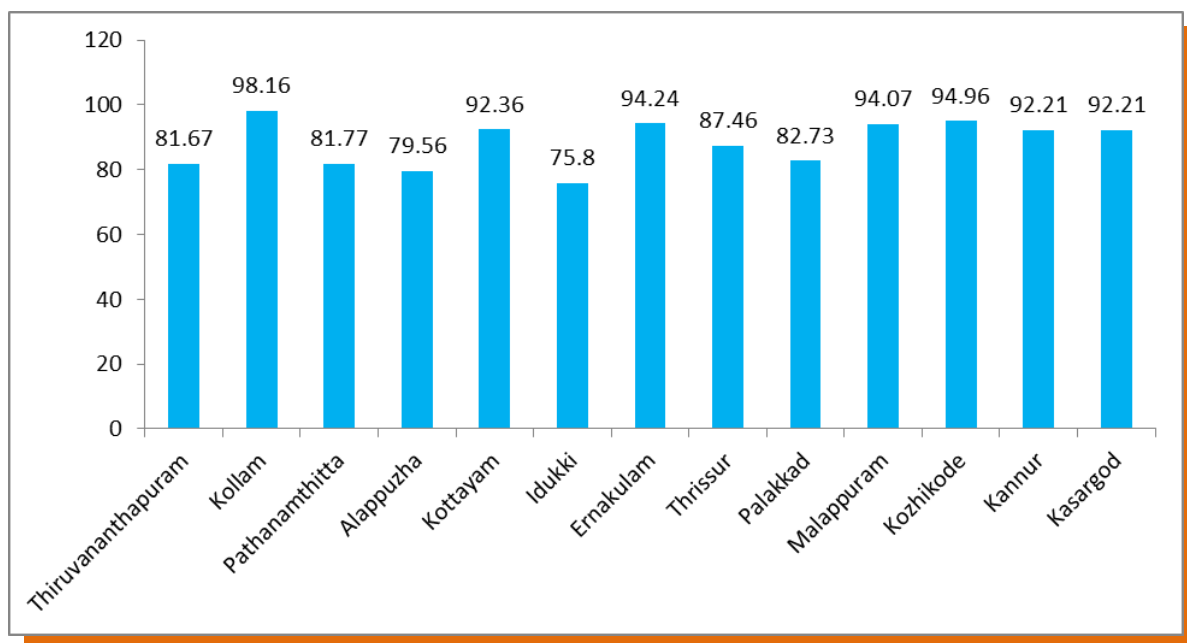


**Table -2.7 Land use particulars of Control Plots**

Sl No	Districts	Area Cultivated		Current fallow		Other use		Area not Cultivated		Total	
		Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	21.341	81.67	0.005	0.02	4.784	18.31	0.000	0.00	26.130	100.00
2	Kollam	38.460	98.16	0.120	0.31	0.600	1.53	0.000	0.00	39.180	100.00
3	Pathanamthitta	23.600	81.77	0.100	0.35	4.710	16.32	0.450	1.56	28.860	100.00
4	Alappuzha	24.910	79.56	1.760	5.62	4.430	14.15	0.210	0.67	31.310	100.00
5	Kottayam	48.963	92.36	0.000	0.00	2.639	4.98	1.410	2.66	53.012	100.00
6	Idukki	42.562	75.80	0.000	0.00	5.862	10.44	7.726	13.76	56.150	100.00
7	Ernakulam	20.630	94.24	0.050	0.23	0.910	4.16	0.300	1.37	21.890	100.00
8	Thrissur	10.740	87.46	0.000	0.00	1.540	12.54	0.000	0.00	12.280	100.00
9	Palakkad	35.630	82.73	0.000	0.00	7.440	17.27	0.000	0.00	43.070	100.00
10	Malappuram	71.255	94.07	0.650	0.86	3.040	4.01	0.800	1.06	75.745	100.00
11	Kozhikode	14.690	94.96	0.000	0.00	0.680	4.40	0.100	0.65	15.470	100.00
12	Kannur	33.510	92.21	0.000	0.00	1.830	5.04	1.000	2.75	36.340	100.00
13	Kasargod	85.200	92.21	0.790	0.85	2.670	2.89	3.740	4.05	92.400	100.00
Total		471.491	88.65	3.475	0.65	41.135	7.73	15.736	2.96	531.837	100.00

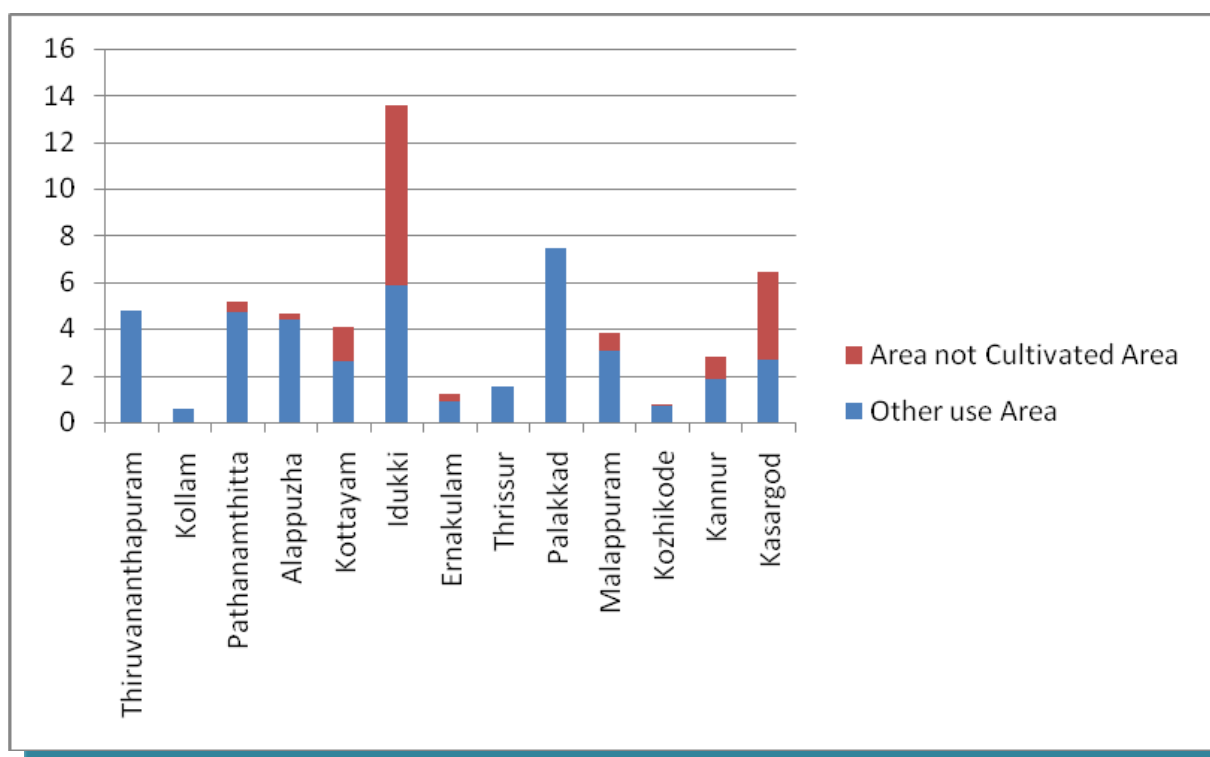
Table 2.7 shows the land use particulars of control plots which describes the area cultivated current fallow other use of land and the area not cultivated. It indicates there is no drastic change compared to the area treated with Soil Conservation works in the case of land use.

**Graph 2.5 Percentage of area cultivated over total area in control plots**

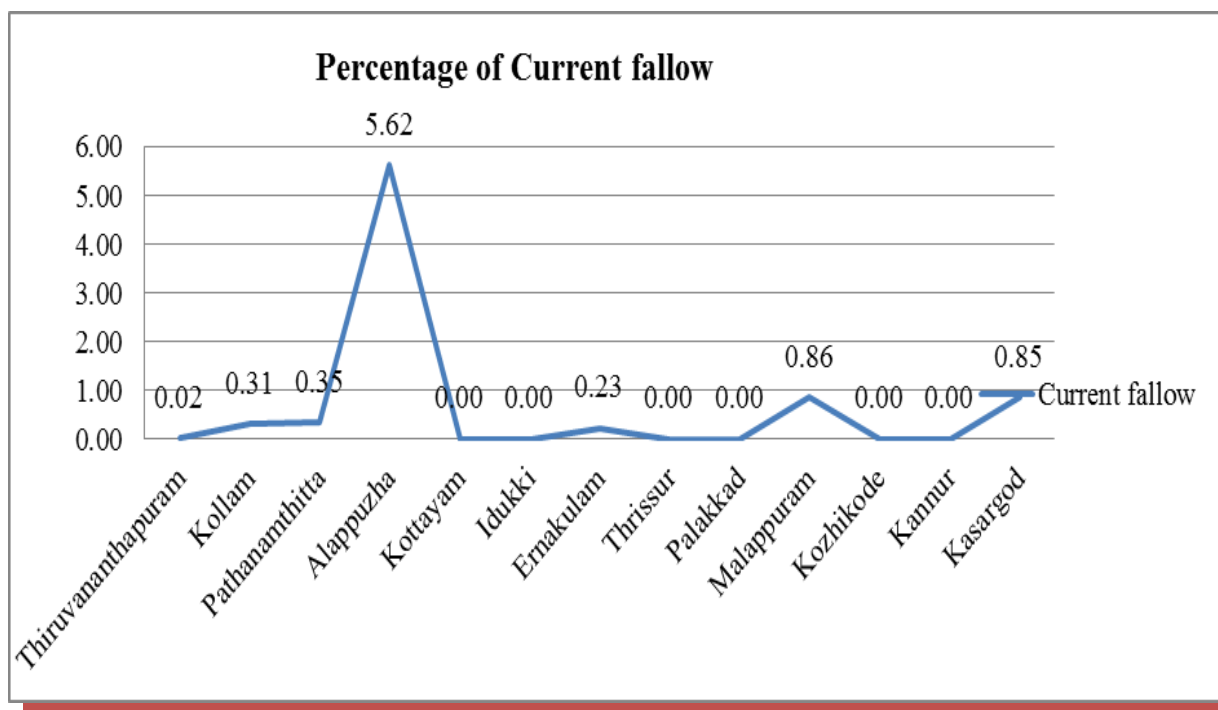




**Graph 2.6 Land use particulars of control plots**



**Graph 2.7 Percentage of Current fallow**





## **2.4 Crop Pattern**

In order to reduce the soil loss an appropriate cropping pattern is essential. The selection of suitable vegetation that form good canopy can reduce erosion since soil loss is governed by the extent of exposed land surface. The binding force of the roots also offers good resistance to erosion. Grass roots have excellent soil binding property. Legumes are also good soil binders. The grasses, legumes and tree crops are classified as erosion preventing or soil conserving crops while cereals, tapioca, ginger, etc. are erosion permitting/erosion favoring crops.

Depending upon the capability class to which a land belongs and the socio-economic needs of the people, the appropriate crops can be selected to achieve maximum conservation of soil and water.

## **2.5 Contour Farming**

Contour farming refers to village practices of applying all treatments along contour; i.e. across the direction of the slope. The crops are cultivated along contour ridges and furrows. In regions of low rainfall contour farming helps in the conservation of rainwater and in human areas it reduces soil loss and increases recharge of aquifers. This practice can minimize the effects of flash floods and droughts.

Mixed farming, inter-cropping, mixed cropping; multi-storage cropping, etc. are also beneficial in controlling soil erosion.

The growing of perennial horticultural crops, including plantation crops will give a permanent protective cover for the soil. In high rainfall areas of the humid tropics this higher level tree cover for the soil helps in reducing the erosive action of highly intensive rainfall.



Consequent in the introduction of the soil conservation programmes significant changes in the cropping pattern occurred which favours perennial crops. In Table- 2.8 the area under perennial crops has increased from 3494.277 acres to 3610.286 acres. It showed an increase of 3.31%. At the same time the area under the cultivation of seasonal crops showed an increase of 1.29%. From this we can arrive at the conclusion that the farmers have shown a tendency to cultivate perennial crops in sloppy regions where the soil conservation measures are carried out.

The figures in the table reveals that after the introduction of soil conservation programmes, the area of perennial crops like Pepper, Coconut, Rubber, Cashew shows a positive increase. These are 4.94%, 2.06%, 7.96% and 8.73% respectively. While the variation of area under Arecanut have decreased to 20.4% after the soil conservation programme.

In seasonal crops, the cultivation of Plantain, Banana, Tapioca, Ginger, Pineapple, Yam, exhibited comparative increase. The respective percentage changes recorded as 10.5%, 0.37%, 17.33%, 122.19% , 8.65%, and 15.38% respectively. . While the variation of area under cheera and Paddy has decreased to 55.56% and 0.14% respectively after the soil conservation programme..

On going through the district wise data, it is noted that the cropping area under different crops are interchanged according to the suitability of land.

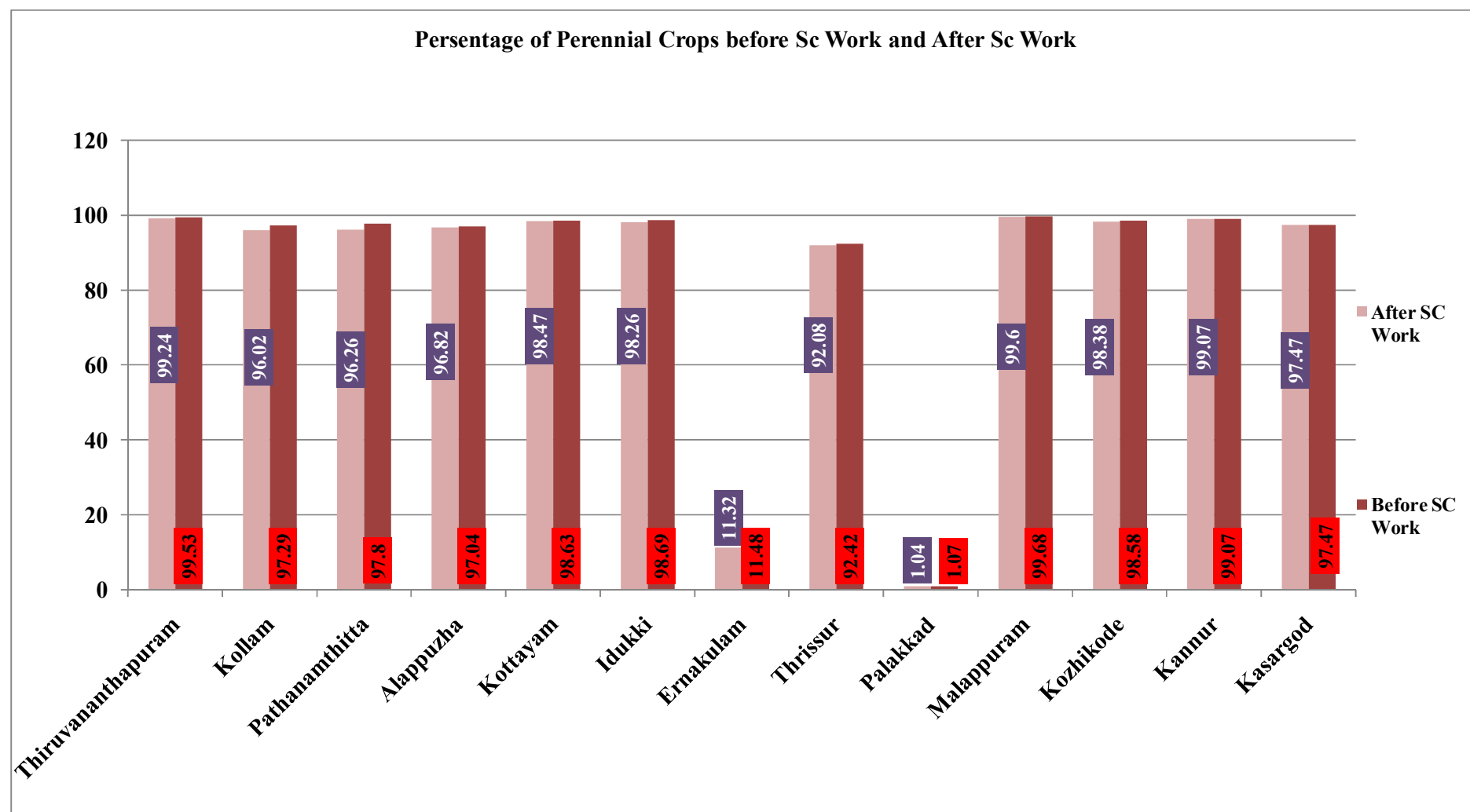


**Table 2.8 Area wise Crop Pattern**

Sl No:	Districts	Perennial Crops				Seasonal Crops				Total Gross area cropped			
		Before SC Work		After SC Work		Before SC Work		After SC Work		Before SC Work		After SC Work	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Thiruvananthapuram	450.366	99.53	591.384	99.24	2.134	0.47	4.523	0.76	452.500	100	595.907	100
2	Kollam	139.657	97.29	142.907	96.02	3.888	2.71	5.923	3.98	143.545	100	148.830	100
3	Pathanamthitta	192.178	97.80	192.613	96.26	4.329	2.20	7.482	3.74	196.507	100	200.095	100
4	Alappuzha	228.721	97.04	231.103	96.82	6.972	2.96	7.580	3.18	235.693	100	238.683	100
5	Kottayam	600.314	98.63	558.867	98.47	8.347	1.37	8.691	1.53	608.661	100	567.558	100
6	Idukki	334.489	98.69	348.961	98.26	4.441	1.31	6.173	1.74	338.930	100	355.134	100
7	Ernakulam	60.773	11.48	59.802	11.32	468.499	88.52	468.406	88.68	529.272	100	528.208	100
8	Thrissur	273.371	92.42	269.206	92.08	22.433	7.58	23.170	7.92	295.804	100	292.376	100
9	Palakkad	3.834	1.07	3.732	1.04	355.181	98.93	355.242	98.96	359.015	100	358.974	100
10	Malappuram	525.874	99.68	528.865	99.60	1.681	0.32	2.141	0.40	527.555	100	531.006	100
11	Kozhikode	61.989	98.58	59.678	98.38	0.893	1.42	0.984	1.62	62.882	100	60.662	100
12	Kannur	123.526	99.07	123.941	99.07	1.159	0.93	1.159	0.93	124.685	100	125.100	100
13	Kasargod	499.185	97.47	499.227	97.47	12.962	2.53	12.962	2.53	512.147	100	512.189	100
Total		3494.277	79.65	3610.286	79.97	892.919	20.35	904.436	20.03	4387.196	100	4514.722	100

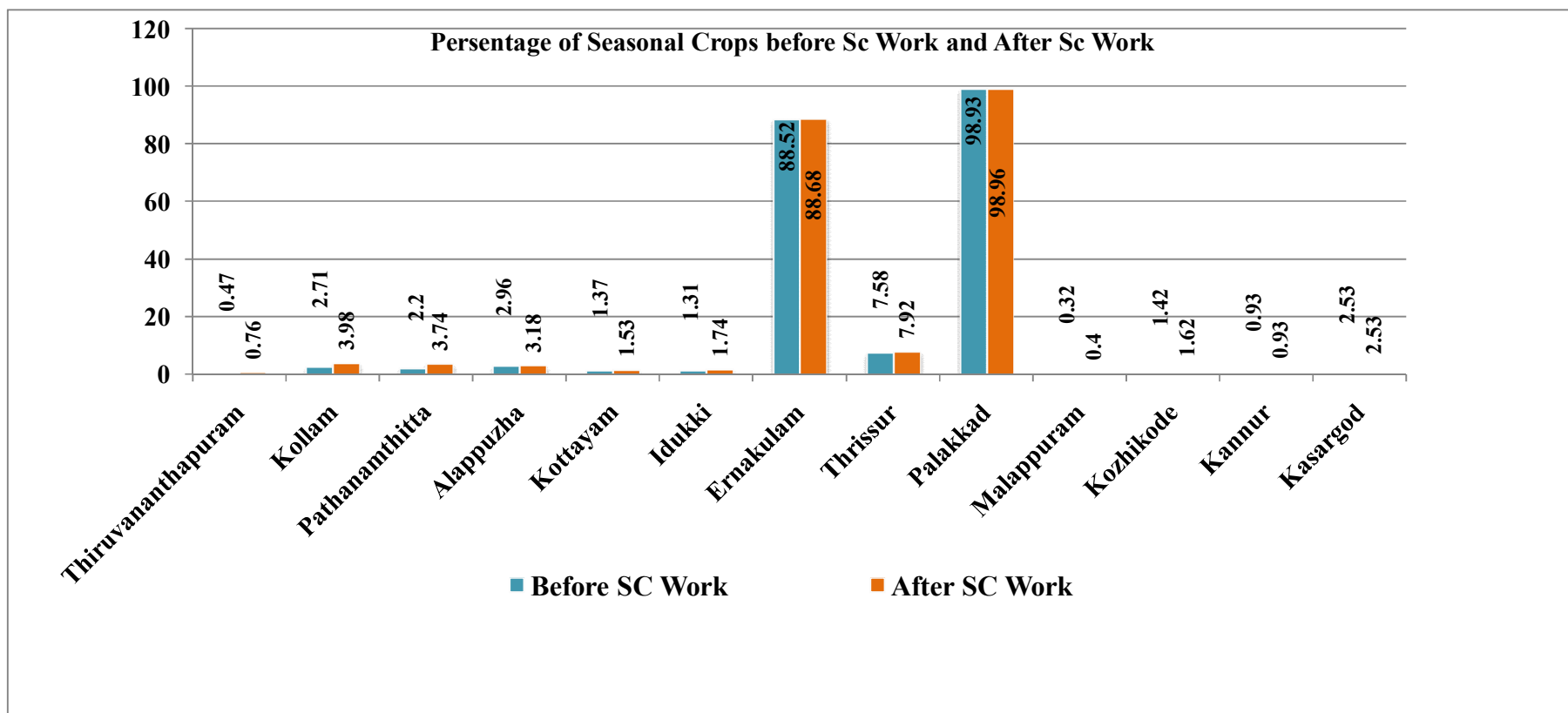


**Graph 2.8 Percentage of Area of Perennial Crops Before SC Work and After SC Work**





**Graph 2.9 Percentage of Area of Seasonal Crops Before SC Work and After SC Work**





After the introduction of Soil Conservation works area of perennial crops increases in Thiruvananthapuram (450.366 to 591.384), Kollam (139.657 to 142.907), Pathanamthitta (192.178 to 192.613), Alappuzha (228.721 to 231.103), Idukki (334.489 to 348.961), Malappuram (525.874 to 528.865), Kannur (123.526 to 123.941) and Kasaragod (499.185 to 499.227)

At the same time it shows a decrease in Kottayam (600.314 to 558.867) Ernakulam (60.773 to 58.802) Thrissur (273.371 to 269.206), Palakkad (3.834 to 3.732) and Kozhikkode (61.989 to 59.678) in the case of seasonal crops the hike can be seen in 9 districts; Ernakulam & Malappuram (both shows a small hike); and Kannur & Kasaragod (both shows the same figure)

While considering the gross area crop; comparing with before and after Soil Conservation works Kottayam (608.661 to 567.558), Ernakulam (529.272 to 528.208), Thrissur (295.804 to 292.376), Palakkad (359.015 to 358.974) and Kozhikkode (62.882 to 60.662). An increase in the cropped area after the Soil Conservation works shows in eight districts; Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha, Idukki, Malappuram, Kannur and Kasaragod.



**Table 2.9 – Area Under Selected Perennial Crops**

Sl no	Districts	pepper			Rubber			coconut			Arecanut		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Thiruvananthapuram	0.140	0.162	15.71	440.355	581.004	31.94	8.922	9.269	3.89	0.009	0.009	0.00
2	Kollam	0.199	0.245	23.12	127.537	129.439	1.49	10.474	11.749	12.17	0.205	0.222	8.29
3	Pathanamthitta	2.771	2.780	0.32	167.447	167.591	0.09	19.974	20.205	1.16	0.334	0.337	0.90
4	Alappuzha	0.202	0.202	0.00	199.916	199.448	-0.23	25.456	27.287	7.19	0.869	0.879	1.15
5	Kottayam	5.608	5.585	-0.41	548.109	507.394	-7.43	31.814	32.208	1.24	0.831	0.853	2.65
6	Idukki	31.955	34.525	8.04	247.105	253.899	2.75	34.136	38.386	12.45	1.213	1.339	10.39
7	Ernakulam	0.468	0.464	-0.85	45.382	44.694	-1.52	7.893	7.799	-1.19	2.584	2.539	-1.74
8	Thrissur	0.000	0.000	0.000	248.803	243.022	-2.32	23.411	23.722	1.33	0.870	0.915	5.17
9	Palakkad	0.444	0.456	2.70	0.000	0.000	0.000	3.367	3.253	-3.39	0.023	0.023	0.00
10	Malappuram	2.870	3.323	15.78	255.742	366.424	43.28	135.684	139.074	2.50	26.315	9.662	-63.28
11	Kozhikode	1.057	0.978	-7.47	3.558	3.558	0.00	52.565	51.300	-2.41	3.788	3.037	-19.83
12	Kannur	0.319	0.319	0.00	95.848	94.538	-1.37	7.693	7.516	-2.30	0.545	0.613	12.48
13	Kasargod	15.569	15.605	0.23	273.344	273.344	0.00	142.645	142.645	0.00	46.360	46.366	0.01
Total		61.602	64.644	4.94	2653.146	2864.355	7.96	504.034	514.413	2.06	83.946	66.794	-20.43



Table 2.9–Contd.....

Sl No	District	Jack			Mango			Cashew		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
		15	16	17	18	19	20	21	22	23
1	Thiruvananthapuram	0.260	0.260	0.00	0.400	0.400	0.00	0.258	0.258	0.00
2	Kollam	0.630	0.630	0.00	0.390	0.400	2.56	0.209	0.209	0.00
3	Pathanamthitta	1.410	1.430	1.42	0.020	0.040	100.00	0.077	0.077	0.00
4	Alappuzha	0.880	0.880	0.00	0.150	0.150	0.00	0.771	0.792	2.72
5	Kottayam	3.000	2.920	-2.67	0.130	0.130	0.00	0.442	0.421	-4.75
6	Idukki	3.920	4.240	8.16	1.400	1.560	11.43			
7	Ernakulam	0.760	0.590	-22.37	0.340	0.370	8.82	0.314	0.314	0.00
8	Thrissur	0.040	0.040	0.00				0.000	1.079	
9	Palakkad									
10	Malappuram	14.280	5.430	-61.97	3.700	1.780	-51.89	0.108	0.108	0.00
11	Kozhikode	0.100	0.100	0.00	0.030	0.030	0.00	0.867	0.651	-24.91
12	Kannur	0.440	0.440	0.00	0.040	0.040	0.00	17.800	19.634	10.30
13	Kasargod	3.660	3.660	0.00				10.058	10.058	0.00
Total		29.380	20.620	-29.82	6.600	4.900	-25.76	30.904	33.601	8.73



Table 2.9–Contd.....

Sl No	District	Nutmeg			Tamarind			coffee		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
		24	25	26	27	28	29	30	31	32
1	Thiruvananthapuram				0.022	0.022	0.00			
2	Kollam							0.003	0.003	0.00
3	Pathanamthitta							0.054	0.052	-3.70
4	Alappuzha	0.098	0.098	0.00				0.344	0.344	0.00
5	Kottayam	0.000	0.074					1.644	1.659	0.91
6	Idukki	0.132	0.132	0.00				12.216	12.458	1.98
7	Ernakulam	2.267	2.267	0.00						
8	Thrissur	0.247	0.428	73.28						
9	Palakkad									
10	Malappuram	87.175	3.064	-96.49						
11	Kozhikode	0.024	0.024	0.00						
12	Kannur	0.412	0.412	0.00				0.083	0.083	0.00
13	Kasargod	4.504	4.504	0.00				1.000	1.000	0.00
Total		94.859	11.003	-88.40	0.022	0.022	0.00	15.344	15.599	1.66



Table 2.9–Contd.....

Sl No.	District	Cardamom			Others			Total		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
		33	34	35	36	37	38	39	40	41
1	Thiruvananthapuram				0.000	0.000	0.00	450.366	591.384	31.31
2	Kollam				0.010	0.010	0.00	139.657	142.907	2.33
3	Pathanamthitta	0.006	0.006	0.00	0.085	0.095	11.76	192.178	192.613	0.23
4	Alappuzha				0.035	1.023	2822.86	228.721	231.103	1.04
5	Kottayam				8.736	7.623	-12.74	600.314	558.867	-6.90
6	Idukki				2.412	2.422	0.41	334.489	348.961	4.33
7	Ernakulam				0.765	0.765	0.00	60.773	59.802	-1.60
8	Thrissur				0.000	0.000	0.00	273.371	269.206	-1.52
9	Palakkad				0.000	0.000	0.00	3.834	3.732	-2.66
10	Malappuram				0.000	0.000	0.00	525.874	528.865	0.57
11	Kozhikode				0.000	0.000	0.00	61.989	59.678	-3.73
12	Kannur				0.346	0.346	0.00	123.526	123.941	0.34
13	Kasargod				2.045	2.045	0.00	499.185	499.227	0.01
Total		0.006	0.006	0.00	14.434	14.329	-0.73	3494.277	3610.286	3.32



Table 2.9 envisages the area under some major perennial crops such as, Pepper, Rubber, Coconut, Arecanut, Mango, Jack, Cashew etc. before and after Soil Conservation works. Area of Pepper, A high level of increase can be seen in Thiruvananthapuram (15.71 %), Kollam (23.12%), Idukki (8.04%) and Malappuram (15.78%). The districts Kozhikkode, Ernakulam and Kottayam show decline and in negative figures of percentage, but the quantity and area of production in these districts are comparatively very low. Rubber is the major crop in Kottayam, Ernakulam, Thrissur and Kannur; in these districts the figures show as less compared with before and after Soil Conservation works due to the decline of price.

## **2.6 *Seasonal Crops in Treated Area***

Area under selected seasonal crops are studied here. Plantain, Banana, Pineapple, Tapioca, Paddy, Ginger and Turmeric were the major seasonal crops in the survey. All these crops were nominal in the area and production; so that a small change will reflect as a larger area and production while considering the percentage. For example, area of plantain in Thiruvananthapuram. But Plantain exists in all schemes in the all districts as it is a very common crop. In the case of the seasonal crop, Banana, which shows its presence in all districts except Kozhikode and Kannur. Tapioca shows except Palakkad and Kannur. Ginger is the other one shows its own stand in seven districts.



**Table 2.10 - Area Under Selected Seasonal Crops**

Sl.No	District	Plantain			Banana			Pineapple		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	Thiruvananthapuram	0.005	0.011	120	0.807	0.782	-3.1			
2	Kollam	1.214	1.638	34.93	1.119	1.717	53.44	0.024	0.028	16.67
3	Pathanamthitta	0.691	0.961	39.07	0.428	0.651	52.1	0.02	0.02	0
4	Alappuzha	3.451	3.859	11.82	0.715	0.715	0			
5	Kottayam	0.074	0.142	91.89	0.295	0.519	75.93			
6	Idukki	2.462	2.85	15.76	0.736	0.867	17.8	0.116	1.167	906.03
7	Eranakulam	3.191	3.191	0	404.252	404.549	0.07	9.056	9.166	1.21
8	Trissur	0.485	0.688	41.86	6.598	6.622	0.36	10	10.5	5
9	Palakkad	0.161	0.222	37.89	0.1	0.1	0			
10	Malappuram	0.622	1	60.77	0	0.062				
11	Kozhikkode	0.502	0.553	10.16						
12	Kannur	1.159	1.159	0						
13	Kasaragod	7.46	7.46	0	4.872	4.872	0	0.03	0.03	0
<b>Total</b>		<b>21.477</b>	<b>23.734</b>	<b>10.51</b>	<b>419.922</b>	<b>421.456</b>	<b>0.37</b>	<b>19.246</b>	<b>20.911</b>	<b>8.65</b>



**Table 2.10 –Contd.....**

Sl.No	District	Tapioca			Cheera			Paddy		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	Thiruvananthapuram	1.322	3.73	182.15						
2	Kollam	1.182	1.834	55.16						
3	Pathanamthitta	1.41	1.78	25.9						
4	Alappuzha	2.09	2.85	37.25						
5	Kottayam	7.878	7.93	0.66				0.57	0	0
6	Idukki	1.127	1.289	14.37						
7	Eranakulam	5.4	5.1	-5.56						
8	Thrissur	3	3.01	0.33	0.36	0.16	-55.56	42.33	42.33	0
9	Palakkad									
10	Malappuram	0.848	1.018	20.05				354.45	354.45	0
11	Kozhikkode	0.06	0.07	25						
12	Kannoor									
13	Kasaragod	0.5	0.5	0						
<b>Total</b>		<b>24.817</b>	<b>29.011</b>	<b>17.33</b>	<b>0.36</b>	<b>0.16</b>	<b>-55.56</b>	<b>397.35</b>	<b>396.78</b>	<b>-.14</b>



**Table 2.10 –Contd.....**

Sl No.	District	Ginger			Yam			Elephant Foot Yam		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	Thiruvananthapuram									
2	Kollam	0.075	0.345	360	0.13	0.15	15.38	0.01	0.045	350
3	Pathanamthitta	1.77	4.06	129.38						
4	Alappuzha	0.03	0.03	0						
5	Kottayam									
6	Idukki									
7	Eranakulam	0.15	0.15	0						
8	Trissur									
9	Palakkad									
10	Malappuram	0	0.05							
11	Kozhikkode	0.011	0.011	0				0.02	0.02	0
12	Kannur									
13	Kasaragod	0.1	0.1	0						
<b>Total</b>		<b>2.136</b>	<b>4.746</b>	<b>122.19</b>	<b>0.13</b>	<b>0.15</b>	<b>15.38</b>	<b>0.03</b>	<b>0.065</b>	<b>116.67</b>



**Table 2.10 –Contd.....**

Sl No.	District	Colacasia			Turmeric			Tamarind		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	Thiruvananthapuram									
2	Kollam	0	0.025	0	0.01	0.02	100	0.055	0.055	0
3	Pathanamthitta									
4	Alappuzha	0.03	0.03	0						
5	Kottayam				0.1	0.1	0			
6	Idukki									
7	Eranakulam				0.06	0.06	0			
8	Trissur									
9	Palakkad									
10	Malappuram							0.011	0.011	0
11	Kozhikkode	0.27	0.3	11.11	0.03	0.03	0			
12	Kannur									
13	Kasaragod									
<b>Total</b>		<b>0.3</b>	<b>0.355</b>	<b>18.33</b>	<b>0.2</b>	<b>0.21</b>	<b>5.00</b>	<b>0.066</b>	<b>0.066</b>	<b>0</b>



**Table 2.10 –Contd.....**

SI No.	District	Papaya			Others			Total		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	Thiruvananthapuram				0	0	0	2.134	4.523	111.95
2	Kollam	0.03	0.03	0	0.039	0.036	-7.69	3.888	5.923	52.34
3	Pathanamthitta	0.01	0.01	0	0	0	0	4.309	7.452	72.83
4	Alappuzha				0.086	0.096	11.63	6.922	7.53	8.72
5	Kottayam				0	0	0	8.347	8.691	4.12
6	Idukki				0	0	0	4.441	6.173	39
7	Eranakulam				3.7	3.7	0	468.499	468.406	-0.02
8	Trissur				2.35	2.35	0	22.433	23.17	3.29
9	Palakkad				0.47	0.47	0	355.181	355.242	0.02
10	Malappuram				0.2	0	0	1.681	2.141	27.36
11	Kozhikkode				0	0	0	0.873	0.964	10.19
12	Kannur				0	0	0	1.159	1.159	0
13	Kasaragod				0	0	0	12.962	12.962	0
<b>Total</b>		<b>0.04</b>	<b>0.04</b>	<b>0</b>	<b>6.845</b>	<b>6.652</b>	<b>-2.82</b>	<b>892.919</b>	<b>904.436</b>	<b>1.29</b>



**Table 2.11 - Crop wise Yield and Value of Perennial Crops in Scheme Area**

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Thiruvananthapuram	Pepper (Pepper dry)	Quintal	0.400	18962.80	0.500	29037.00	23703.50	25.000
	Pepper (Pepper green)	Quintal	0.390	5838.30	0.560	8720.88	8383.20	43.590
	Rubber (Rubber garbled)	Quintal	0.00	0.00	2214.090	27290873.34	0.00	10544.663
	Rubber (Rubber ungarbled)	Quintal	47.040	683585.28	10.350	119635.65	150406.20	-77.997
	Coconut(With husk)	Number	15087.000	166862.22	17188.000	215881.28	190099.28	13.926
	Coconut(With out husk)	Number	410.000	4337.80	2971.000	35028.09	31433.18	624.634
	Arecanut	Number	160.000	160.00	226.500	391.84	226.50	41.563
	Jack	Quintal	11.750	3630.75	15.750	0.00	4866.75	34.043
	Mango	Quintal	9.750	15366.00	12.450	34996.95	19621.20	27.692
	Cashew	Quintal	2.070	13808.97	9.410	103218.29	62774.11	354.589
	Tamarind(Tamarind without seed and husk)	Quintal	0.080	673.36	0.120	1200.00	1010.04	50.000
	Tamarind(Tamarind with seed and husk)	Quintal	0.250	666.75	0.250	0.00	666.75	0.000
	<b>Total</b>			<b>913892.23</b>		<b>27838983.32</b>	<b>493190.71</b>	



**Table 2.11 –Contd.....**

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Kollam	Pepper(Pepper dry)	Quintal	0.052	2404.38	0.068	4298.62	3144.18	30.769
	Pepper(Pepper green)	Quintal	1.417	22415.52	1.805	37273.25	28553.29	27.382
	Rubber(Rubber garbled)	Quintal	6.400	98585.60	7.800	99223.80	120151.20	21.875
	Rubber(Rubber ungarbled)	Quintal	1081.920	16228800.00	1392.975	16882857.00	20894625.00	28.750
	Coconut(With husk)	Number	24485.000	392249.70	29691.000	501184.08	475649.82	21.262
	Coconut(With out husk)	Number	280.000	4396.00	300.000	5082.00	4710.00	7.143
	Arecanut	Number	14328.000	17480.16	20611.000	29679.84	25145.42	43.851
	Jack	Quintal	19.570	12055.12	23.830	42608.04	14679.28	21.768
	Mango	Quintal	2.310	2714.25	3.350	7755.25	3936.25	45.022
	Cashew	Quintal	1.240	9393.00	1.665	20854.13	12612.38	34.274
	Tamarind(Tamarind with seed and husk)	Quintal	1.070	6598.69	1.280	3280.64	7893.76	19.626
	<b>Total</b>			<b>16797092.42</b>		<b>17634096.65</b>	<b>21591100.58</b>	



Table 2.11 –Contd.....

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Pathanamthitta	Pepper(Pepper green)	Quintal	14.770	230530.16	15.590	294183.30	243328.72	5.552
	Rubber(Rubberungarbled)	Quintal	539.300	7963303.80	612.980	6882539.44	9051262.68	13.662
	Coconut(With husk)	Number	29309.000	402412.57	33182.000	431366.00	455588.86	13.214
	<b>Total</b>			<b>8596246.53</b>		<b>7608088.74</b>	<b>9750180.26</b>	
Alappuzha	Pepper(Pepper dry)	Quintal	0	0.00	2.910	180326.88	0.00	42.647
	Rubber(Rubber ungarbled)	Quintal	2593.870	33805907.71	2678.480	31560529.84	34908629.84	3.262
	Coconut(With husk)	Number	132585.000	1650683.25	142307.000	1748953.03	1771722.15	7.333
	Coconut(With out husk)	Number	590.000	7439.90	615.000	8050.35	7755.15	4.237
	Arecanut	Number	121155.000	121155.00	133870.000	215530.70	133870.00	10.495
	Jack	Quintal	0	0.00	50.820	44264.22	0.00	25.543
	Mango	Quintal	3.300	6039.00	4.500	8145.00	8235.00	36.364
	Cashew	Quintal	0	0.00	6.600	70468.20	0.00	37.500
	Nutmeg	Quintal	0	0.00	0.130	2912.00	0.00	44.444
	<b>Total</b>			<b>35591224.86</b>		<b>33839180.22</b>	<b>36830212.14</b>	



**Table 2.11 –Contd.....**

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Kottayam	Pepper (Pepper dry)	Quintal	28.300	1441969.90	41.300	2532020.40	2104358.90	45.936
	Rubber (Rubber garbled)	Quintal	1593.850	24846527.65	1940.980	25723807.94	30257937.22	21.779
	Coconut(With husk)	Number	68500.000	805560.00	93952.000	1128363.52	1104875.52	37.156
	Coconut (With out husk)	Number	350.000	4308.50	650.000	8294.00	8001.50	85.714
	Arecanut	Number	69907.000	87383.75	76227.000	105955.53	95283.75	9.041
	Jack	Quintal	0	0	159.200	132613.60	0.00	74.027
	Cashew	Quintal	2.000	15000.00	2.800	32200.00	21000.00	40.000
	Coco(without husk)	Quintal	58.760	213651.36	59.010	248432.10	214560.36	0.425
	Coffee(Dry robusta)	Quintal	19.920	135615.36	23.900	170168.00	162711.20	19.980
	<b>Total</b>			<b>27550016.52</b>		<b>30081855.09</b>	<b>33968728.45</b>	



Table 2.11 –Contd.....

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Idukki	pepper(Pepper dry)	Quintal	44.359	2209743.58	48.116	2958604.73	2396898.54	8.470
	Rubber(Rubber garbled)	Quintal	1937.570	29916080.80	2060.450	26316067.40	31813348.00	6.342
	Rubber(Rubber ungarbled)	Quintal	48.000	705792.00	52.500	582592.50	771960.00	9.375
	coconut(With husk)	Number	1690.000	17880.20	1892.000	23195.92	20017.36	11.953
	coconut(With out husk)	Number	72684.000	968877.72	85270.000	1134943.70	1136649.10	17.316
	Arecanut	Number	142308.000	101038.68	157265.000	113230.80	111658.15	10.510
	Jack	Quintal	0	0	566.200	301784.60	0.00	10.586
	mango	Quintal	163.950	0.00	173.720	343965.60	0.00	5.959
	Nutmeg	Quintal	2.450	74024.30	2.550	57375.00	77045.70	4.082
	coco(with husk)	Quintal	77.070	58110.78	90.560	99616.00	68282.24	17.504
	coffee(Dry robusta)	Quintal	201.350	1369784.05	219.790	1518968.69	1495231.37	9.158
	Total			35421332.11		33450344.94	37891090.46	



Table 2.11 –Contd.....

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Ernakulam	Pepper(Pepper dry)	Quintal	2.485	122977.68	3.830	232519.30	189539.04	54.125
	Rubber(Rubber garbled)	Quintal	4.000	62104.00	4.750	61550.50	73748.50	18.750
	Rubber(Rubber ungarbled)	Quintal	341.170	5019634.21	388.230	4462703.85	5712027.99	13.794
	Coconut(With husk)	Number	24680.000	314423.20	33961.000	389872.28	432663.14	37.605
	Arecanut	Number	264320.000	198240.00	315507.000	315507.00	236630.25	19.366
	Jack	Quintal	35.900	15796.00	49.700	38418.10	21868.00	38.440
	Mango	Quintal	17.300	43942.00	24.550	44828.30	62357.00	41.908
	Cashew	Quintal	6.230	35124.74	7.930	80116.79	44709.34	27.287
	Nutmeg	Quintal	39.820	1196829.92	50.040	1110888.00	1504002.24	25.665
	Coco(without husk)	Quintal	18.890	33981.00	23.930	113858.94	112471.00	26.681
	<b>Total</b>			<b>7043052.75</b>		<b>6850263.06</b>	<b>8390016.50</b>	
Thrissur	Rubber(Rubber garbled)	Quintal	1853.600	28932842.40	1917.300	25521180.30	29927135.70	3.437
	Coconut(With out husk)	Number	47580.000	469497.60	61292.000	653372.72	605564.96	28.819
	Arecanut	Number	21630.000	25307.10	33150.000	51714.00	38785.50	53.259
	Jack	Quintal	2.000	900.00	2.200	2827.00	990.00	10.000
	Nutmeg	Quintal	0.390	12031.50	0.560	11984.00	17276.00	43.590
	<b>Total</b>			<b>29440578.60</b>		<b>26241078.02</b>	<b>30589752.16</b>	



Table 2.11 –Contd.....

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Palakkad	Pepper (Pepper dry)	Quintal	0.495	23535.76	0.600	35808.00	28528.20	21.212
	coconut(With husk)	Number	23680.000	244851.20	25700.000	254430.00	265738.00	8.530
	Arecanut	Number	2000.000	1580.00	440.000	761.20	347.60	-78.000
	Total			269966.96		290999.20	294613.80	
Malappuram	Pepper(Pepper dry)	Quintal	3.275	160366.93	3.035	176388.13	148614.85	-7.328
	Rubber(Rubber garbled)	Quintal	1013.540	15532500.50	1008.240	13335990.48	15451278.00	-0.523
	Rubber(Rubber ungarbled)	Quintal	18.150	264717.75	18.840	215303.52	274781.40	3.802
	Coconut(With husk)	Number	39122.000	343882.38	41055.000	364157.85	360873.45	4.941
	Coconut(With out husk)	Number	799783.000	7006099.08	860396.000	7631712.52	7537068.96	7.579
	Arecanut	Number	1388625.000	1110900.00	1451113.000	1741335.60	1160890.40	4.500
	Jack	Quintal	142.400	24920.00	175.360	133975.04	30688.00	23.146
	Mango	Quintal	11.010	26710.26	15.700	30128.30	38088.20	42.598
	Cashew	Quintal	0.800	4780.80	1.000	11460.00	5976.00	25.000
	Nutmeg	Quintal	4.182	145797.07	4.548	101420.40	158556.92	8.752
	Tamarind(Tamarind with seed and husk)	Quintal	0.300	1325.10	0.500	2008.50	2208.50	66.667
	Total			24621999.87		23743880.34	25169024.68	



**Table 2.11 –Contd.....**

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Kozhikode	Pepper (Pepper dry)	Quintal	2.228	109450.44	1.801	104761.78	88493.94	-19.165
	Rubber (Rubber garbled)	Quintal	0.000	0.00	20.000	263480.00	311640.00	Infinity
	Coconut (With husk)	Number	187020.000	1782300.60	189645.000	1682151.15	1807316.85	1.404
	Coconut (With out husk)	Number	1500.000	14175.00	1500.000	13905.00	14175.00	0.000
	Arecanut	Number	411500.000	460880.00	326400.000	293760.00	365568.00	-20.680
	Mango	Quintal	0.400	1107.20	0.400	800.00	1107.20	0.000
	Cashew	Quintal	11.300	72907.60	10.670	127794.59	68842.84	-5.575
	Nutmeg	Quintal	0.050	1574.65	0.050	1235.00	1574.65	0.000
	<b>Total</b>			<b>2442395.49</b>		<b>2487887.52</b>	<b>2658718.48</b>	
Kannur	Pepper(Pepper dry)	Quintal	0.850	42128.55	1.140	65771.16	56501.82	34.118
	Rubber(Rubber ungarbled)	Quintal	407.100	5901728.70	574.900	6453252.50	8334325.30	41.218
	Coconut(With husk)	Number	24840.000	205923.60	28680.000	276475.20	237757.20	15.459
	Arecanut	Number	69500.000	62550.00	83700.000	143127.00	75330.00	20.432
	Mango	Quintal	1.500	0.00	1.750	5437.25	0.00	16.667
	Cashew	Quintal	52.300	344970.80	60.650	680068.45	400047.40	15.966
	Coco (without husk)	Quintal	0.200	700.80	0.200	0.00	700.80	0.000
	<b>Total</b>			<b>6558002.45</b>		<b>7624131.56</b>	<b>9104662.52</b>	



**Table 2.11 –Contd.....**

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Kasargod	Pepper (Pepper dry)	Quintal	210.640	11362764.16	233.380	13436386.74	12589450.72	10.796
	Rubber (Rubber ungarbled)	Quintal	3496.230	50391162.99	3652.260	42731442.00	52640023.38	4.463
	Coconut (With husk)	Number	771087.000	8481957.00	815766.000	7904772.54	8973426.00	5.794
	Arecanut	Number	10227123.000	13192988.67	10516277.000	20611902.92	13565997.33	2.827
	Cashew	Quintal	55.695	404234.31	66.960	879251.76	485995.68	20.226
	Nutmeg	Quintal	79.970	2007806.79	86.260	1983980.00	2165729.82	7.865
	Coco (without husk)	Quintal	53.600	248811.20	56.900	277387.50	264129.80	6.157
	<b>Total</b>			<b>86089725.12</b>		<b>87825123.46</b>	<b>90684752.73</b>	



**Table 2.11 –Contd.....**

	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
KERALA	Pepper (Pepper dry)	Quintal	295.124	15494304.18	336.680	19755922.74	17629233.68	14.081
	Pepper (Pepper green)	Quintal	16.577	258783.98	17.955	340177.43	280265.22	8.313
	Rubber (Rubber garbled)	Quintal	6429.760	99388640.95	9173.610	118612173.76	107955238.62	42.674
	Rubber (Rubber ungarbled)	Quintal	8572.780	120964632.44	9381.515	109890856.30	132738041.79	9.434
	Coconut (With husk)	Number	1342085.000	14808985.92	1453019.000	14920802.85	16095727.63	8.266
	Coconut (With out husk)	Number	923177.000	8479131.60	1012994.000	9490388.38	9345357.85	9.729
	Arecanut	Number	12732556.000	15379663.36	13114786.500	23622896.43	15809732.90	3.002
	Jack	Quintal	855.580	57301.87	1043.060	696490.60	73092.03	21.913
	Mango	Quintal	209.520	95878.71	236.420	476056.65	133344.85	12.839
	Cashew	Quintal	136.435	900220.22	167.685	2005432.21	1101957.75	22.905
	Nutmeg	Quintal	126.952	3438064.23	144.138	3269794.40	3924185.33	13.537
	Tamarind(Tamarind without seed and husk)	Quintal	0.080	673.36	0.120	1200.00	1010.04	50.000
	Tamarind(Tamarind with seed and husk)		1.620	8590.54	2.030	5289.14	10769.01	25.309
	Coco(with husk)	Quintal	77.070	58110.78	90.560	99616.00	68282.24	17.504
	Coco(without husk)	Quintal	131.450	497144.36	140.040	639678.54	591861.96	6.535
	Coffee(Dry robusta)	Quintal	221.270	1505399.41	243.690	1689136.69	1657942.57	10.132
	<b>Total</b>			<b>281335525.91</b>		<b>305515912.12</b>	<b>307416043.47</b>	



The crop wise yield and value as per the year 2017-18 is calculated in Table 2.11. In Thiruvananthapuram most of all perennial crops except rubber shows hike in quantity and price after Soil Conservation works.

The price of rubber shows decrease in the market and so as the area of cultivation and production and which indicated as 77% of change negatively over the quantity. In Kollam which illustrates high value of quantity and value of price in all perennial crops mentioned in the table. Mango shows as 45% of rise.

Pepper, Rubber & Coconut are indicated in Pathanamthitta district which expresses an increase in quantity and value as well. Among these, rubber points to 13.662% of rise.

Alappuzha, Idukki, Ernakulam, Thrissur, Kannur and Kasargod show an increase in all crops while Palakkad stands with 78% of less in arecanut.



**Table 2.12 Crop wise yield and value of Seasonal crops in scheme area**

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Thiruvananthapuram	Plantain	Quintal	0.180	320.58	0.750	1770.75	1335.75	316.667
	Banana	Quintal	32.600	122869.40	31.110	141612.72	117253.59	-4.571
	Tapioca(Tapioca raw)	Quintal	1183.950	1811443.50	357.050	792651.00	546286.50	-69.842
	Total			1934633.48		936034.47	664875.84	
Kollam	Plantain	Quintal	69.015	134303.19	96.333	222818.21	187464.02	39.583
	banana	Quintal	243.240	1030364.64	90.045	468684.23	381430.62	-62.981
	pineapple	Quintal	1.190	2716.77	1.555	3845.51	3550.07	30.672
	Tapioca(Tapioca raw)	Quintal	68.580	113431.32	112.422	179762.78	185945.99	63.928
	Ginger(Ginger green)	Quintal	1.780	17906.80	2.955	15912.68	29727.30	66.011
	yam	Quintal	7.250	25411.25	11.820	46015.26	41429.10	63.034
	Elephant Foot yam	Quintal	1.170	2200.77	4.010	13401.42	7542.81	242.735
	Colocasia	Quintal	0.430	1871.79	3.000	16392.00	13059.00	597.674
	Drumstick	Quintal	0.230	578.91	0.295	971.43	742.51	28.261
	Kovakka	Quintal	0.090	184.77	0.125	388.00	256.63	38.889
	Snake gourd	Quintal	0.180	300.42	0.210	495.18	350.49	16.667
	Pumpkin	Quintal	0.000	0.00	0.210	451.92	205.80	
	Turmeric (Turmeric green)	Quintal	0.300	727.50	0.745	1529.49	1806.63	148.333
	<b>Total</b>			<b>1329998.13</b>		<b>970668.11</b>	<b>853510.96</b>	



Table –2.12 Contd...

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Pathanamthitta	Banana	Quintal	35.420	142140.46	41.750	201652.50	167542.75	17.871
	Tapioca(Tapioca raw)	Quintal	12.300	25042.80	12.800	26278.40	26060.80	4.065
	<b>Total</b>			<b>167183.26</b>		<b>227930.90</b>	<b>193603.55</b>	
Alappuzha	Plantain	Quintal	214.030	338595.46	245.200	478875.60	387906.40	14.563
	Banana	Quintal	64.050	256712.40	101.150	552279.00	405409.20	57.923
	Tapioca(Tapioca raw)	Quintal	200.090	348156.60	239.080	496808.24	415999.20	19.486
	Paddy(Paddy Local)	Quintal	4.400	7920.00	0.000	0.00	0.00	-100.000
	Ginger(Ginger green)	Quintal	0.700	10966.90	0.750	4119.00	11750.25	7.143
	Colocasia	Quintal	0.710	0.00	0.900	4554.00	0.00	26.761
	Drumstic	Quintal	0.230	0.00	0.300	909.90	0.00	30.435
	Cowpea	Quintal	0.400	1557.20	0.630	3385.62	2452.59	57.500
	Vazhuthana	Quintal	0.400	850.00	0.900	2089.80	1912.50	125.000
	Ladies finger	Quintal	0.250	687.50	0.300	897.60	825.00	20.000
	Bittergourd	Quintal	1.100	3776.30	1.200	5640.00	4119.60	9.091
	<b>Total</b>			<b>969222.36</b>		<b>1549558.76</b>	<b>1230374.74</b>	



Table –2.12 Contd...

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Kottayam	Plantain	Quintal	3.300	5560.50	7.500	13650.00	12637.50	127.273
	Banana	Quintal	18.320	72327.36	36.390	162881.64	143667.72	98.635
	Tapioca (Tapioca raw)	Quintal	266.900	496434.00	249.700	500149.10	464442.00	-6.444
	Turmeric (Turmeric green)	Quintal	0.200	266.60	0.250	3048.75	333.25	25.000
	<b>Total</b>			<b>574588.46</b>		<b>679729.49</b>	<b>621080.47</b>	
Idukki	Plantain	Quintal	244.110	368850.21	291.300	465788.70	440154.30	19.331
	Banana	Quintal	72.220	249159.00	89.710	356238.41	309499.50	24.218
	Pineapple	Quintal	3.530	5545.63	35.810	83007.58	56257.51	914.448
	Tapioca (Tapioca raw)	Quintal	188.840	337079.40	211.550	427965.65	377616.75	12.026
	<b>Total</b>			<b>960634.24</b>		<b>1333000.34</b>	<b>1183528.06</b>	



Table –2.12 Contd...

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Ernakulam	Plantain	Quintal	272.240	429050.24	318.650	535969.30	502192.40	17.047
	Banana	Quintal	354.880	1342865.92	418.740	1771270.20	1584512.16	17.995
	Pineapple	Quintal	234.140	409042.58	309.970	835369.15	541517.59	32.387
	Tapioca (Tapioca raw)	Quintal	448.990	800998.16	490.500	865242.00	875052.00	9.245
	Cheera	Quintal	7.000	10542.00	3.750	7155.00	5647.50	-46.429
	Paddy (Paddy High yeild)	Quintal	1054.380	1476132.00	1144.050	2070730.50	1601670.00	8.505
	Ginger (Ginger green)	Quintal	3.400	26469.00	4.000	19980.00	31140.00	17.647
	Koorka	Quintal	2.000	4556.00	2.500	7930.00	5695.00	25.000
	Cowpea	Quintal	17.300	0.00	22.300	105055.30	0.00	28.902
	Cucumber	Quintal	11.000	10604.00	14.000	16184.00	13496.00	27.273
	Ashgourd	Quintal	6.000	7224.00	7.000	9954.00	8428.00	16.667
	Kovakka	Quintal	21.000	42147.00	25.000	67075.00	50175.00	19.048
	Bittergourd	Quintal	27.500	82390.00	39.000	139347.00	116844.00	41.818
	Snake gourd	Quintal	28.000	43204.00	29.000	58232.00	44747.00	3.571
	Turmeric (Turmeric green)	Quintal	1.500	0.00	1.800	3240.00	0.00	20.000
	<b>Total</b>			<b>4685224.90</b>		<b>6512733.45</b>	<b>5381116.65</b>	



Table –2.12 Contd...

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Thirissur	Plantain	Quintal	18.600	32289.60	33.300	48384.90	57808.80	79.032
	Banana	Quintal	527.800	2101699.60	586.000	2686224.00	2333452.00	11.027
	Pineapple	Quintal	380.000	837140.00	415.000	1162000.00	914245.00	9.211
	Tapioca(Tapioca raw)	Quintal	300.000	517200.00	351.000	737100.00	605124.00	17.000
	Vazhuthana	Quintal	14.500	26100.00	14.750	30267.00	26550.00	1.724
	Ladies finger	Quintal	13.750	28132.50	15.050	42561.40	30792.30	9.455
	<b>Total</b>			<b>3542561.70</b>		<b>4706537.30</b>	<b>3967972.10</b>	
Palakkad	Plantain	Quintal	14.800	24420.00	20.400	34945.20	33660.00	37.838
	Banana	Quintal	6.500	23530.00	7.000	27174.00	25340.00	7.692
	Paddy (Paddy High yield)	Quintal	5905.315	10068562.08	6057.740	12006440.68	10328446.70	2.581
	Koorka	Quintal	13.800	29752.80	14.000	40852.00	30184.00	1.449
	<b>Total</b>			<b>10146264.88</b>		<b>12109411.88</b>	<b>10417630.70</b>	
Malappuram	Plantain	Quintal	79.360	133245.44	90.800	167889.20	152453.20	14.415
	Banana	Quintal	0.000	0.00	12.000	46560.00	42708.00	
	Tapioca (Tapioca raw)	Quintal	32.400	49701.60	63.000	111132.00	96642.00	94.444
	Ginger (Ginger green)	Quintal	0.000	0.00	0.800	2596.00	6192.00	
	Cowpea	Quintal	0.000	0.00	0.030	106.95	83.97	
	<b>Total</b>			<b>182947.04</b>		<b>328284.15</b>	<b>298079.17</b>	



Table –2.12 Contd...

District	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Kozhikode	Plantain	Quintal	32.530	62262.42	37.060	64373.22	70932.84	13.926
	Tapioca (Tapioca raw)	Quintal	1.250	2271.25	2.900	5710.10	5269.30	132.000
	Ginger (Ginger green)	Quintal	0.260	1518.14	0.160	358.72	934.24	-38.462
	Elephant Foot yam	Quintal	0.860	1282.26	0.900	1800.00	1341.90	4.651
	Colocasia	Quintal	6.550	16997.25	6.710	20130.00	17412.45	2.443
	Turmeric (Turmeric dry)	Quintal	0.150	1109.25	0.150	1725.00	1109.25	0.000
	<b>Total</b>			<b>85440.57</b>		<b>94097.04</b>	<b>96999.98</b>	
Kannur	Plantain	Quintal	46.300	88942.30	50.250	102309.00	96530.25	8.531
	<b>Total</b>			<b>88942.30</b>		<b>102309.00</b>	<b>96530.25</b>	
Kasargod	Plantain	Quintal	3687.940	7032901.58	3769.240	7915404.00	7187940.68	2.204
	Banana	Quintal	460.960	1760406.24	493.850	2097874.80	1886013.15	7.135
	Pineapple	Quintal	1.240	2976.00	1.450	3529.30	3480.00	16.935
	Tapioca(Tapioca raw)	Quintal	67.500	137227.50	78.750	159783.75	160098.75	16.667
	Ginger(Ginger dry)	Quintal	0.500	9500.00	0.550	7700.00	10450.00	10.000
	<b>Total</b>			<b>8943011.32</b>		<b>10184291.85</b>	<b>9247982.58</b>	



Table –2.12 Contd...

	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
KERALA	Plantain	Quintal	4682.405	8650741.52	4960.783	10052178.08	9131016.14	5.945
	Banana	Quintal	1815.990	7102075.02	1907.745	8512451.50	7396828.69	5.053
	Pineapple	Quintal	620.100	1257420.98	763.785	2087751.54	1519050.17	23.171
	Tapioca (Tapioca raw)	Quintal	2770.800	4638986.13	2168.752	4302583.02	3758537.29	-21.728
	Cheera	Quintal	7.000	10542.00	3.750	7155.00	5647.50	-46.429
	Paddy (Paddy High yield)	Quintal	6959.695	11544694.08	7201.790	14077171.18	11930116.70	3.479
	Paddy (Paddy Local)	Quintal	4.400	7920.00	0.000	0.00	0.00	-100.000
	Ginger (Ginger dry)	Quintal	0.500	9500.00	0.550	7700.00	10450.00	10.000
	Ginger (Ginger green)	Quintal	6.140	56860.84	8.665	42966.40	79743.79	41.124
	Yam	Quintal	7.250	25411.25	11.820	46015.26	41429.10	63.034
	Elephant Foot yam	Quintal	2.030	3483.03	4.910	15201.42	8884.71	141.872
	Colocasia	Quintal	7.690	18869.04	10.610	41076.00	30471.45	37.971
	Drumstick	Quintal	0.460	578.91	0.595	1881.33	742.51	29.348
	Koorka	Quintal	15.800	34308.80	16.500	48782.00	35879.00	4.430
	Cowpea	Quintal	17.700	1557.20	22.960	108547.87	2536.56	29.718
	Vazhuthana	Quintal	14.900	26950.00	15.650	32356.80	28462.50	5.034
	Cucumber	Quintal	11.000	10604.00	14.000	16184.00	13496.00	27.273
	Ladies finger	Quintal	14.000	28820.00	15.350	43459.00	31617.30	9.643
	Ashgourd	Quintal	6.000	7224.00	7.000	9954.00	8428.00	16.667
	Kovakka	Quintal	21.090	42331.77	25.125	67463.00	50431.63	19.132
	Bittergourd	Quintal	28.600	86166.30	40.200	144987.00	120963.60	40.559
	Snake gourd	Quintal	28.180	43504.42	29.210	58727.18	45097.49	3.655
	Pumpkin	Quintal	0.000	0.00	0.210	451.92	205.80	0
	Turmeric (Turmeric dry)	Quintal	0.150	1109.25	0.150	1725.00	1109.25	0.000
	Turmeric (Turmeric green)	Quintal	2.000	994.10	2.795	7818.24	2139.88	39.750
	<b>Total</b>			<b>33610652.64</b>		<b>39734586.74</b>	<b>34253285.05</b>	



**Table-2.13 Quantity and Value of Selected perennial and seasonal crops**

	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Perennial	Pepper (Pepper dry)	Quintal	295.124	15494304.18	336.680	19755922.74	17629233.68	14.081
	Pepper (Pepper green)	Quintal	16.577	258783.98	17.955	340177.43	280265.22	8.313
	Rubber (Rubber garbled)	Quintal	6429.760	99388640.95	9173.610	118612173.76	107955238.62	42.674
	Rubber (Rubber ungarbled)	Quintal	8572.780	120964632.44	9381.515	109890856.30	132738041.79	9.434
	Coconut (With husk)	Number	1342085	14808985.92	1453019.000	14920802.85	16095727.63	8.266
	Coconut (With out husk)	Number	923177	8479131.60	1012994.000	9490388.38	9345357.85	9.729
	Arecanut	Number	12732556	15379663.36	13114786.500	23622896.43	15809732.90	3.002
	Jack	Quintal	855.580	57301.87	1043.060	696490.60	73092.03	21.913
	Mango	Quintal	209.520	95878.71	236.420	476056.65	133344.85	12.839
	Cashew	Quintal	136.435	900220.22	167.685	2005432.21	1101957.75	22.905
	Nutmeg	Quintal	126.952	3438064.23	144.138	3269794.40	3924185.33	13.537
	Tamarind (Tamarind without seed and husk)	Quintal	0.080	673.36	0.120	1200.00	1010.04	50.000
	Tamarind (Tamarind with seed and husk)	Quintal	1.620	8590.54	2.030	5289.14	10769.01	25.309
	Coco (with husk)	Quintal	77.070	58110.78	90.560	99616.00	68282.24	17.504
	Coco (without husk)	Quintal	131.450	497144.36	140.040	639678.54	591861.96	6.535
	Coffee (Dry robusta)	Quintal	221.270	1505399.41	243.690	1689136.69	1657942.57	10.132
	<b>Total</b>			281335525.91		305515912.12	307416043.47	



Table –2.13 Contd...

	Name of crops	Units	Before SC Work		After SC Work		Value at Constant Price	% Change over Quantity
			Quantity	Value	Quantity	Value		
Seasonal	Plantain	Quintal	4682.405	8650741.52	4960.783	10052178.08	9131016.14	5.945
	Banana	Quintal	1815.990	7102075.02	1907.745	8512451.50	7396828.69	5.053
	Pineapple	Quintal	620.100	1257420.98	763.785	2087751.54	1519050.17	23.171
	Tapioca(Tapioca raw)	Quintal	2770.800	4638986.13	2168.752	4302583.02	3758537.29	-21.728
	Cheera	Quintal	7.000	10542.00	3.750	7155.00	5647.50	-46.429
	Paddy(Paddy High yield)	Quintal	6959.695	11544694.08	7201.790	14077171.18	11930116.70	3.479
	Paddy(Paddy Local)	Quintal	4.400	7920.00	0.000	0.00	0.00	-100.000
	Ginger(Ginger dry)	Quintal	0.500	9500.00	0.550	7700.00	10450.00	10.000
	Ginger(Ginger green)	Quintal	6.140	56860.84	8.665	42966.40	79743.79	41.124
	Yam	Quintal	7.250	25411.25	11.820	46015.26	41429.10	63.034
	Elephant Foot yam	Quintal	2.030	3483.03	4.910	15201.42	8884.71	141.872
	Colocasia	Quintal	7.690	18869.04	10.610	41076.00	30471.45	37.971
	Drumstic	Quintal	0.460	578.91	0.595	1881.33	742.51	29.348
	Koorka	Quintal	15.800	34308.80	16.500	48782.00	35879.00	4.430
	Cowpea	Quintal	17.700	1557.20	22.960	108547.87	2536.56	29.718
	Vazhuthana	Quintal	14.900	26950.00	15.650	32356.80	28462.50	5.034
	Cucumber	Quintal	11.000	10604.00	14.000	16184.00	13496.00	27.273
	Ladies finger	Quintal	14.000	28820.00	15.350	43459.00	31617.30	9.643
	Ashgourd	Quintal	6.000	7224.00	7.000	9954.00	8428.00	16.667
	Kovakka	Quintal	21.090	42331.77	25.125	67463.00	50431.63	19.132
	Bittergourd	Quintal	28.600	86166.30	40.200	144987.00	120963.60	40.559
	Snake gourd	Quintal	28.180	43504.42	29.210	58727.18	45097.49	3.655
	Pumpkin	Quintal	0.000	0.00	0.210	451.92	205.80	0.000
	Turmeric (Turmeric dry)	Quintal	0.150	1109.25	0.150	1725.00	1109.25	0.000
	Turmeric (Turmeric green)	Quintal	2.000	994.10	2.795	7818.24	2139.88	39.750
	Total			33610652.64		39734586.74	34253285.05	
	All Crops			314946178.55		345250498.86	341669328.51	

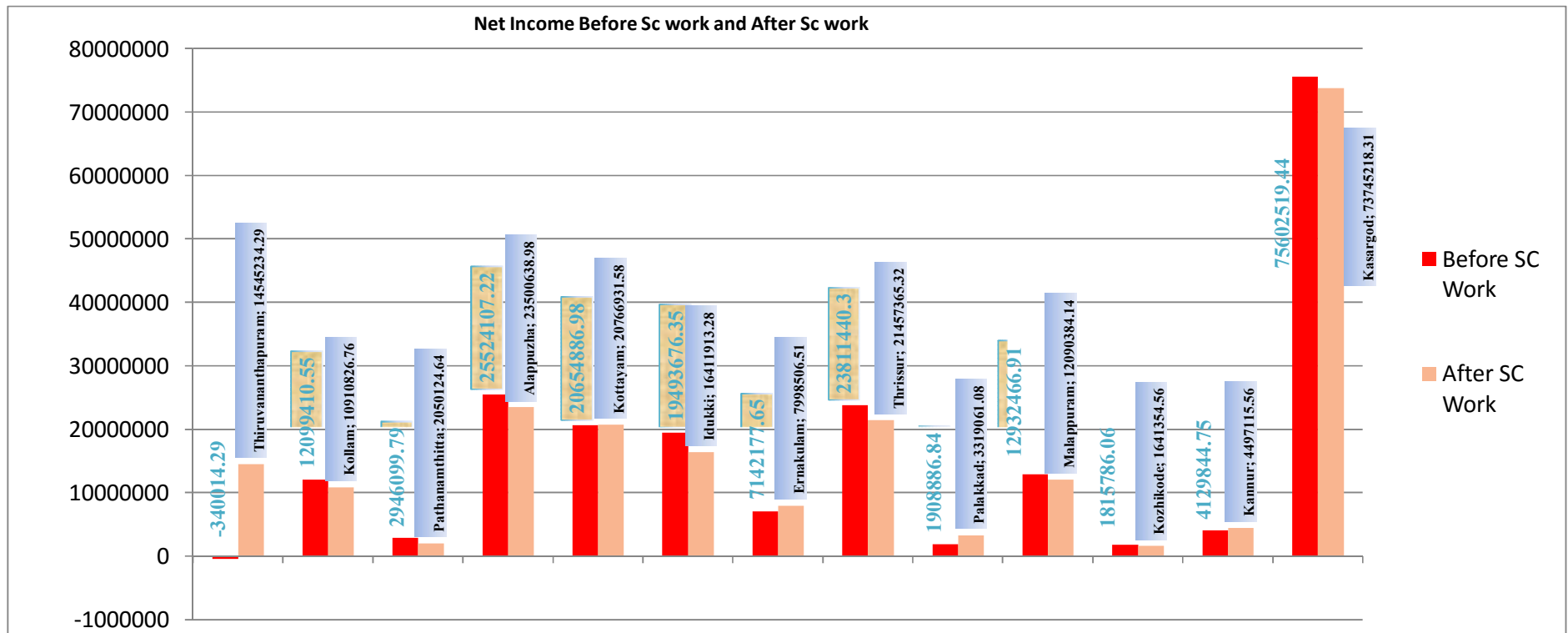


**Table-2.14 Total Income, Expenditure and Net Income of Scheme Area (Rs)**

Sl No	Name of District	Income (Rs)		Expenditure (Rs)						Net Income (Rs)	
		Before SC Work	After SC Work	Before SC Work	After SC Work					Before SC Work	After SC Work
					Wages	Fertilizers	Pesticides	Others	Total		
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	2848525.71	28775017.79	3188540.00	10328483.50	2456785.00	330840.00	1113675.00	14229783.50	-340014.29	14545234.29
2	Kollam	18127090.55	18604764.76	6027680.00	6001675.00	1125737.00	128935.00	437591.00	7693938.00	12099410.55	10910826.76
3	Pathanamthitta	8763429.79	7836019.64	5817330.00	3620310.00	1094660.00	21475.00	1049450.00	5785895.00	2946099.79	2050124.64
4	Alappuzha	36560447.22	35388738.98	11036340.00	11411350.00	315950.00	4100.00	156700.00	11888100.00	25524107.22	23500638.98
5	Kottayam	28124604.98	30761584.58	7469718.00	8726633.00	649785.00	57540.00	560695.00	9994653.00	20654886.98	20766931.58
6	Idukki	36381966.35	34783345.28	16888290.00	13141000.00	1992966.00	65419.00	3172047.00	18371432.00	19493676.35	16411913.28
7	Ernakulam	11728277.65	13362996.51	4586100.00	2441550.00	637830.00	117840.00	2167270.00	5364490.00	7142177.65	7998506.51
8	Thrissur	32983140.30	30947615.32	9171700.00	9195200.00	243550.00	0.00	51500.00	9490250.00	23811440.30	21457365.32
9	Palakkad	10416231.84	12400411.08	8507345.00	3950500.00	1066830.00	87795.00	3976225.00	9081350.00	1908886.84	3319061.08
10	Malappuram	24804946.91	24072164.49	11872480.00	8049600.00	487600.35	46850.00	3397730.00	11981780.35	12932466.91	12090384.14
11	Kozhikode	2527836.06	2581984.56	712050.00	898600.00	10100.00	0.00	31930.00	940630.00	1815786.06	1641354.56
12	Kannur	6646944.75	7726440.56	2517100.00	2814400.00	208150.00	23275.00	183500.00	3229325.00	4129844.75	4497115.56
13	Kasargod	95032736.44	98009415.31	19430217.00	19062250.00	5191297.00	10650.00	0.00	24264197.00	75602519.44	73745218.31
State		314946178.55	345250498.86	107224890.00	99641551.50	15481240.35	894719.00	16298313.00	132315823.85	207721288.55	212934675.01



**Graph -2.10 Net Income Before SC Work and After SC Work**



After the soil conservation studies the total income, expenditure and net income of the beneficiaries in the implemented area in all the districts shows that the net income hiked after the Sc works, the indication of negative figure in Thiruvananthapuram Districts is due to less income generation before the sc works.

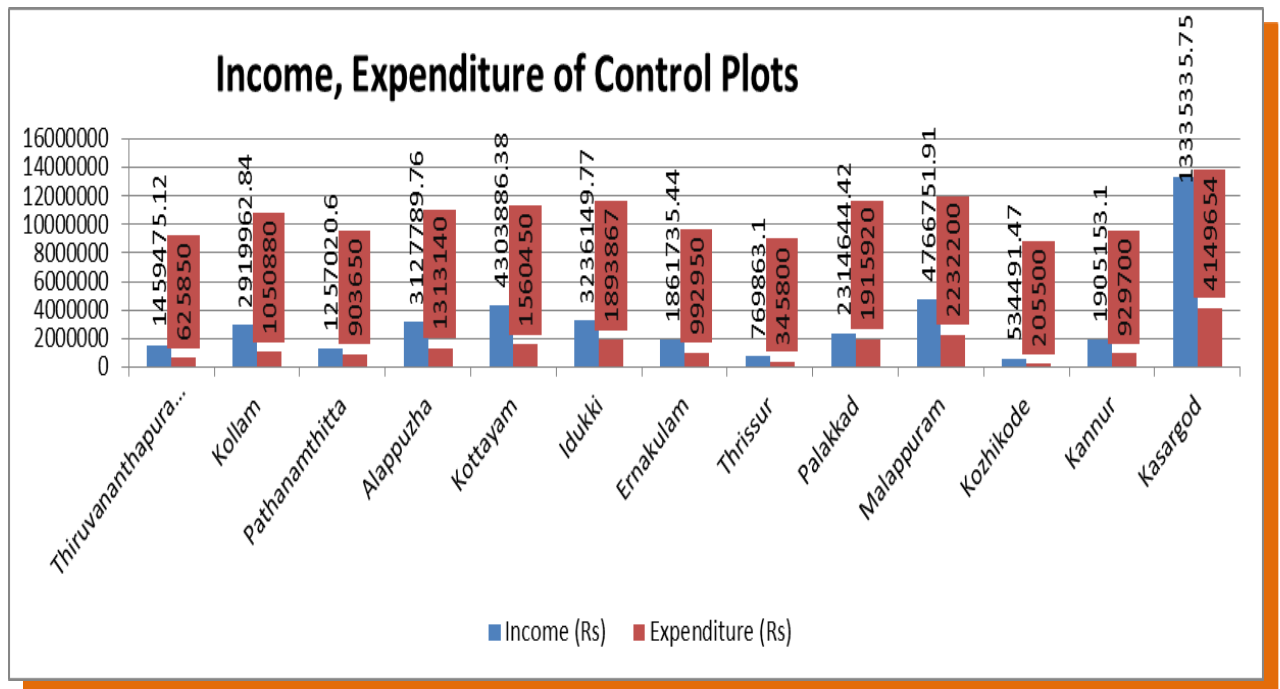


**Table-2.15 Income, Expenditure and Net Income of Control Plots**

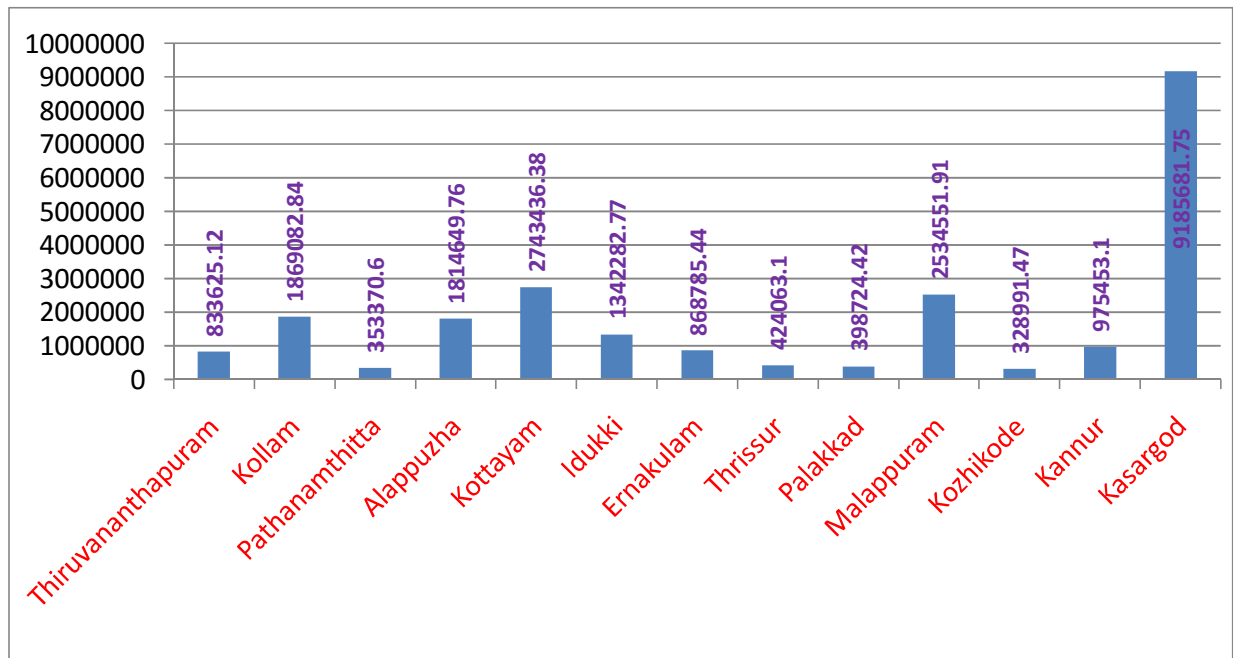
Sl No:	Name of District	Total area (in acres)	Income (Rs)	Expenditure (Rs)	Net Income (Rs)
1	Thiruvananthapuram	26.13	1459475.12	625850	833625.12
2	Kollam	39.18	2919962.84	1050880	1869082.84
3	Pathanamthitta	28.86	1257020.6	903650	353370.6
4	Alappuzha	31.31	3127789.76	1313140	1814649.76
5	Kottayam	53.012	4303886.38	1560450	2743436.38
6	Idukki	56.15	3236149.77	1893867	1342282.77
7	Ernakulam	21.89	1861735.44	992950	868785.44
8	Thrissur	12.28	769863.1	345800	424063.1
9	Palakkad	43.07	2314644.42	1915920	398724.42
10	Malappuram	75.745	4766751.91	2232200	2534551.91
11	Kozhikode	15.47	534491.47	205500	328991.47
12	Kannur	36.34	1905153.1	929700	975453.1
13	Kasargod	92.4	13335335.75	4149654	9185681.75
<b>State</b>		<b>531.837</b>	<b>41792259.66</b>	<b>18119561</b>	<b>23672698.66</b>



**Graph -2.11 Income & Expenditure of Control Plots**



**Graph -2.12 Net Income of Control Plot in Rupees**



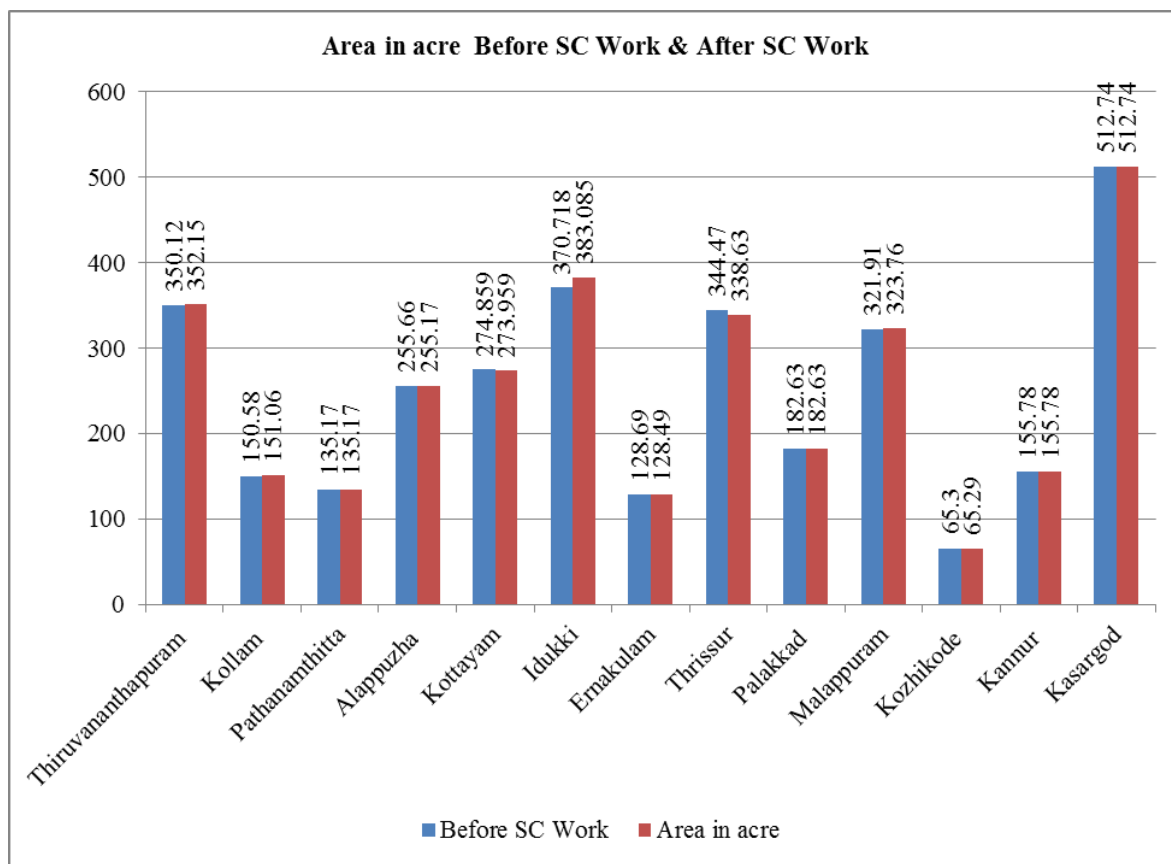


**Table-2.16 Income per acre before and after soil conservation program**

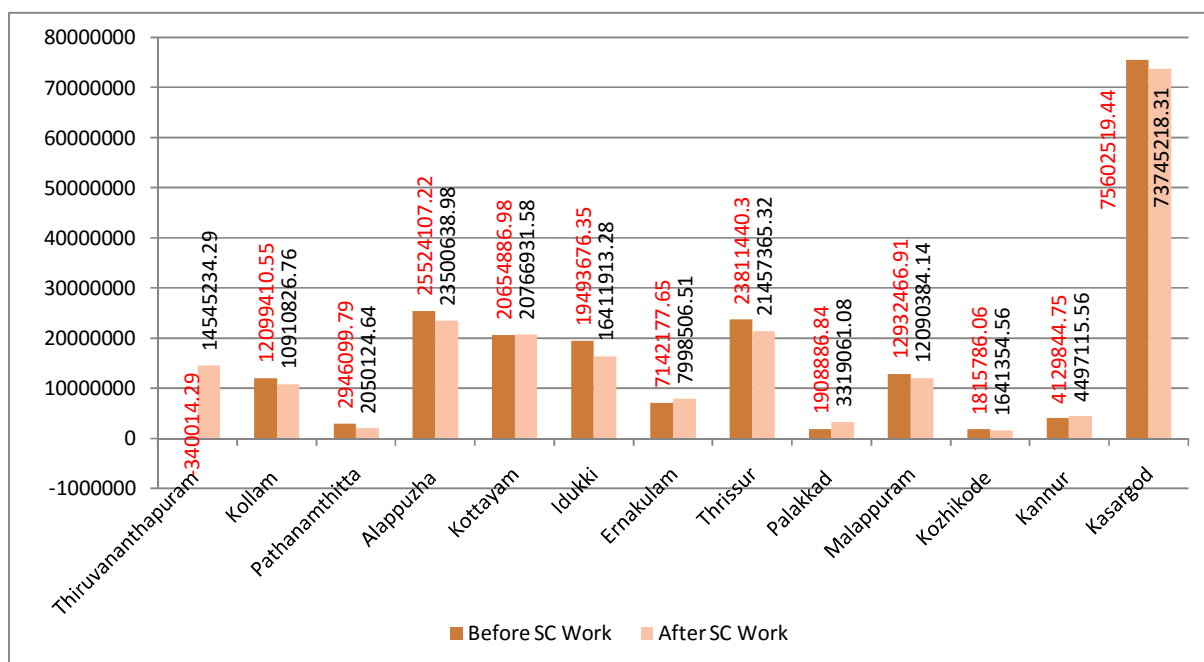
Sl No	Name of District	Before SC Work			After SC Work		
		Area in acre	Net Income (Rs)	Net Income per Acre (Rs)	Area in acre	Net Income (Rs)	Net Income per Acre (Rs)
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	350.120	-340014.29	-971.14	352.150	14545234.29	41304.09
2	Kollam	150.580	12099410.55	80352.04	151.060	10910826.76	72228.43
3	Pathanamthitta	135.170	2946099.79	21795.52	135.170	2050124.64	15167.01
4	Alappuzha	255.660	25524107.22	99836.14	255.170	23500638.98	92097.97
5	Kottayam	274.859	20654886.98	75147.21	273.959	20766931.58	75803.06
6	Idukki	370.718	19493676.35	52583.57	383.085	16411913.28	42841.44
7	Ernakulam	128.690	7142177.65	55499.09	128.490	7998506.51	62250.03
8	Thrissur	344.470	23811440.30	69124.86	338.630	21457365.32	63365.22
9	Palakkad	182.630	1908886.84	10452.21	182.630	3319061.08	18173.69
10	Malappuram	321.910	12932466.91	40174.17	323.760	12090384.14	37343.66
11	Kozhikode	65.300	1815786.06	27806.83	65.290	1641354.56	25139.45
12	Kannur	155.780	4129844.75	26510.75	155.780	4497115.56	28868.38
13	Kasargod	512.740	75602519.44	147448.06	512.740	73745218.31	143825.76
State		3248.627	207721288.55	63941.26	3257.914	212934675.01	65359.21



**Graph -2.13 Area in Acre Before SC Work & After SC Work**

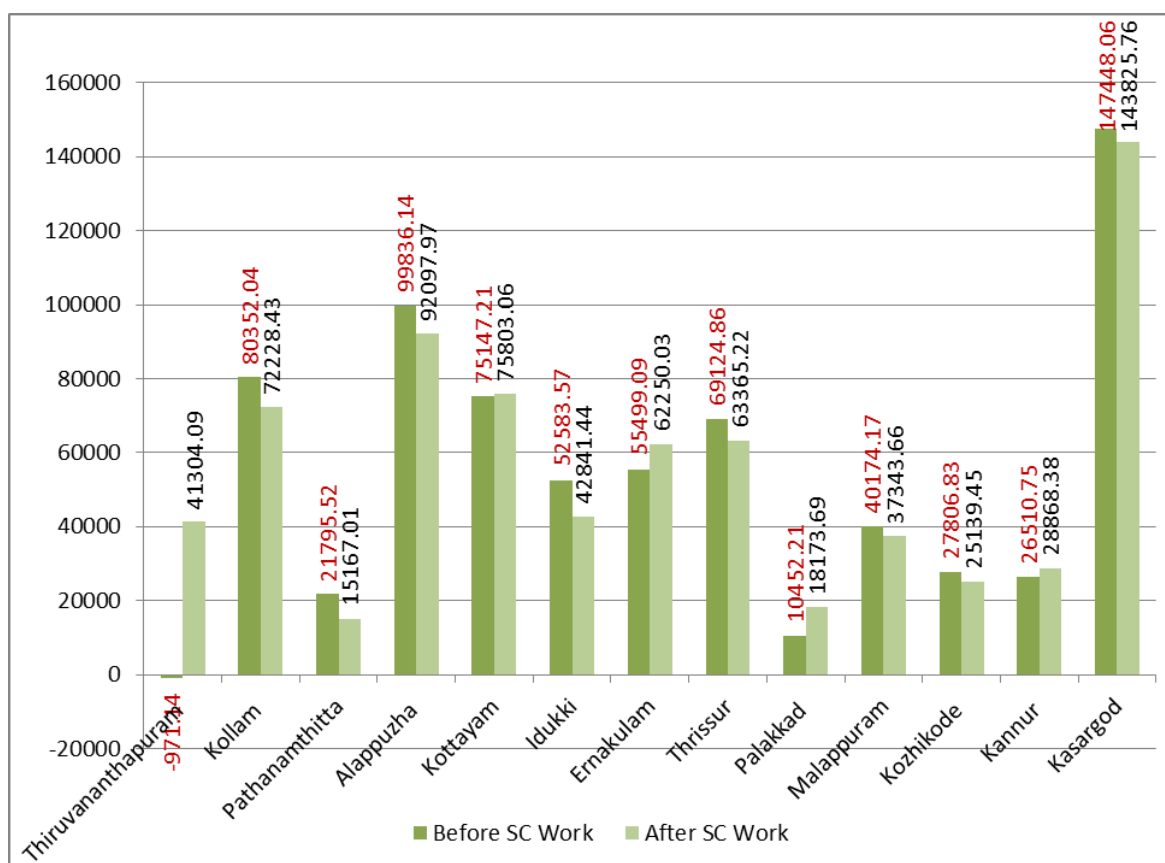


**Graph -2.14 Net Income in Rupees Before SC Work & After SC Work**





**Graph -2.15 Net Income per Acre in Rupees Before SC Work & After SC Work**

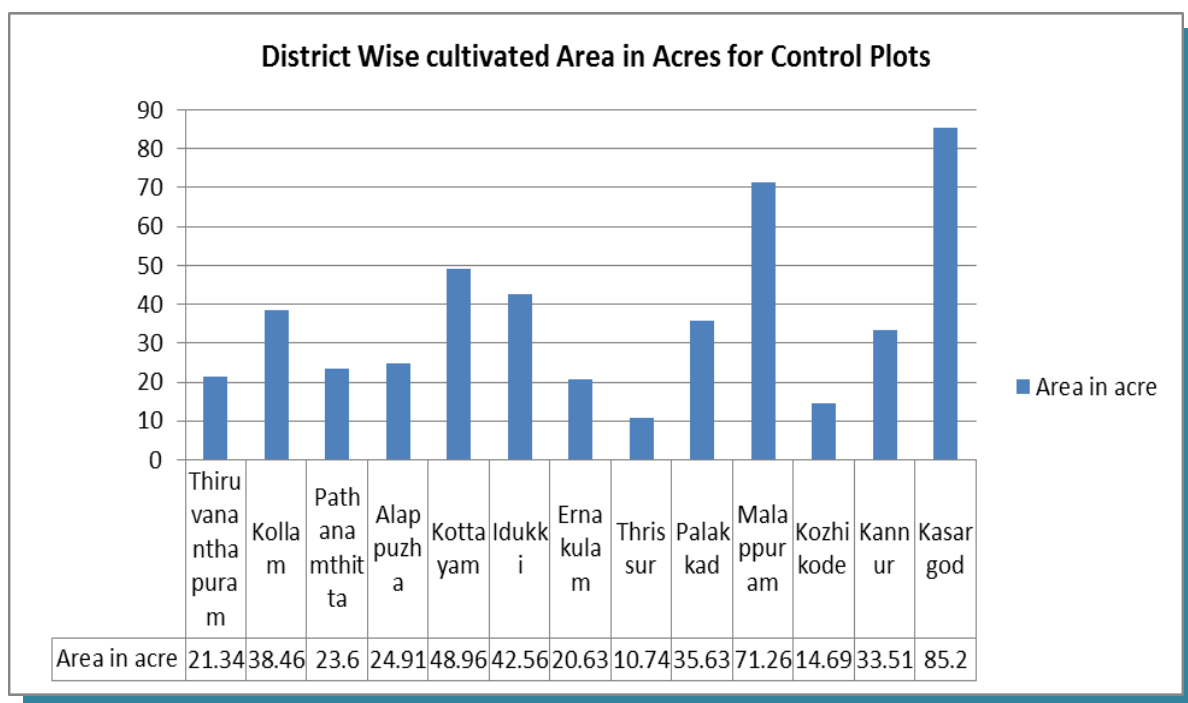


**Table 2.17 Income per acre in the Control Plots**

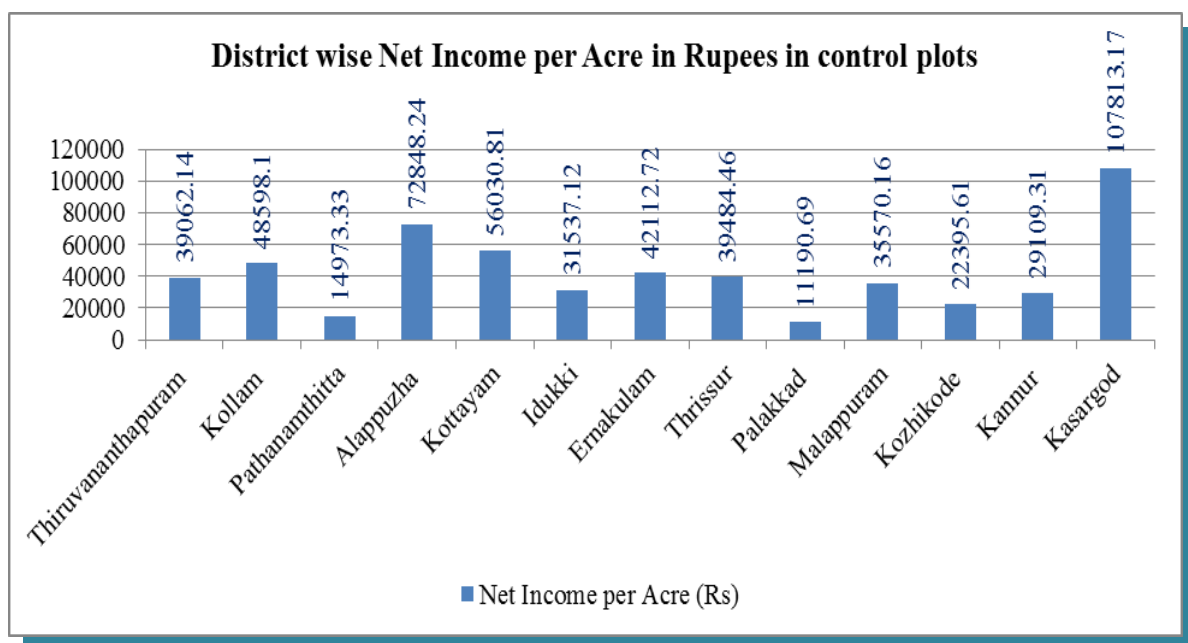
Sl No:	Name of District	Area cultivated in acre	Net Income (Rs)	Net Income per Acre (Rs)
1	2	3	4	5
1	Thiruvananthapuram	21.341	833625.12	39062.14
2	Kollam	38.460	1869082.84	48598.10
3	Pathanamthitta	23.600	353370.60	14973.33
4	Alappuzha	24.910	1814649.76	72848.24
5	Kottayam	48.963	2743436.38	56030.81
6	Idukki	42.562	1342282.77	31537.12
7	Ernakulam	20.630	868785.44	42112.72
8	Thrissur	10.740	424063.10	39484.46
9	Palakkad	35.630	398724.42	11190.69
10	Malappuram	71.255	2534551.91	35570.16
11	Kozhikode	14.690	328991.47	22395.61
12	Kannur	33.510	975453.10	29109.31
13	Kasargod	85.200	9185681.75	107813.17
<b>State</b>		<b>471.491</b>	<b>23672698.66</b>	<b>50208.17</b>



**Graph -2.16 District Wise cultivated Area in Acres in the Control Plots**



**Graph -2.17 District wise Net Income per Acre in Rupees in control plots**





## **2.7 Cost Benefit Analysis of Soil Conservation Programme**

Productive benefits are the direct returns from the programmes implemented. In regular agricultural lands, increase in the yield provides the productive benefits. In addition, production from degraded land, which are cultivated after the soil conservation measures are also taken into consideration.

Protective benefits are the intangible benefits derived from implementation of soil conservation programme. These benefits are more stable and provide base for the continued prosperity in the area. In the case of agricultural land, protective benefits are assessed in terms of these increased values because of the prevention of further soil erosion and its increased productive potentialities.

In the light of the present study an attempt is made for cost benefit analysis with the collected data. Total cost incurred for the soil conservation works, including maintenance work for the year 2017-18 .is Rs.10,32,43,585/-.

The total area under cultivation after soil conservation work was 3257.914 acres. The value of crops before the soil conservation programme comes to Rs 314946178.55 The value of crops after the implementation of soil conservation programme has also been calculated as Rs345250498.8/- . It is estimated that the value at constant price as Rs 341669328.51/-

Several benefits flow from the soil conservation programme implementation, three of them, which derive special attention s are taken up for consideration.



*They are:*

- a. Extension of area under cultivation
- b. Increase in productivity
- c. Diversification of cropping pattern

***a) Extension of area under cultivation***

The study revealed that 9.287 (the difference between the area of cultivation before and after sc work) acres of land has been additionally brought under cultivation by cultivating areas which were not cultivated before soil conservation programme. This benefit is achieved only due to the implementation of soil conservation programme.

***b) Increase in Production***

Production also increased due to the implementation of soil conservation programme. In the case of perennial crops Nutmeg 13.54 %, Coco (with husk) 17.50%, Mango 12.84%, Pepper dry 14.08%, Rubber (garbled) 42.67. Coco (without husk) 6.54%, Pepper (green ) 8.31%,. In the case of seasonal crops, percentage increase in production Yam 63.03% Cowpea 29.72 %, Pineapple 23.17.% , Plantain 5.95 % and Banana 5.05 % respectively.

***c) Diversification of cropping pattern***

Soil Conservation Programmes increased the soil capacity and which facilitates the cultivation of more remunerative crops. This advantage can be reaped in full, only if the conservation programmes are followed properly, i.e. the dissemination of new techniques of production, adequate provision of inputs and service which will promote the land to improve production.

In the scheme area, cultivation of perennial crops has shown encouraging performance. The conservation programmes will lead to the growing of perennial crops will accelerate conservation of soil more effectively and potentially.



### *Chapter III*

#### **3.1 General Observations**

During the survey period the staffs of this department has visited all the beneficiary plots.

The distribution of holdings of the selected beneficiaries of the soil conservation programmes reveals that 59 % of the beneficiary holding belongs to less than one acre, 33.24 % have holding area between one acre to 3 acres. And above 3 acre were 6.02% and up to 5 acres were 1.74% respectively.

The opinion of selected beneficiaries is collected. Out of this, 23 % of the beneficiaries reported that contour bunds effectively controlled soil erosion while about 77% rests in the opinion that it moderately controlled soil erosion.

About the fertility of the soil 8% are of the view that the conservation measures have improved the fertility of the soil remarkably controlled while 92% reported that the fertility of the soil has improved moderately and 0.6 % opinioned that it has no effect on the fertility of the soil.

Similarly regarding the moisture retention 6% reported that the scheme has substantially controlled moisture retention while 93% reported that the scheme has caused moisture retention moderately only 0.8% are no effect. Details are presented in Table No.3.1



**Table-3.1      Opinion of cultivators about effectiveness of bunds, Fertility of the soil and  
Moisture retention of Scheme Area**

SI No	Name of District	Effectiveness of Bunds			Fertility of soil			Moisture Retention			Total
		Effective	Moderately Effective	No Effect	Remarkably Improved	Moderately Improved	No Improvement	Substantially Increased	Moderately Increased	No Change	
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	125	437	0	30	532	0	22	540	0	562
2	Kollam	57	124	3	6	176	2	1	181	2	184
3	Pathanamthitta	0	314	0	0	314	0	0	314	0	314
4	Alappuzha	18	388	2	2	404	2	1	403	4	408
5	Kottayam	1	189	0	0	190	0	0	190	0	190
6	Idukki	188	32	0	5	215	0	0	218	2	220
7	Ernakulam	160	12	0	85	87	0	47	125	0	172
8	Thrissur	0	111	2	0	113	0	0	112	1	113
9	Palakkad	2	242	1	0	244	1	0	243	2	245
10	Malappuram	2	222	0	2	222	0	0	224	0	224
11	Kozhikode	2	75	0	0	76	1	1	75	1	77
12	Kannur	1	124	0	0	125	0	0	125	0	125
13	Kasargod	152	120	2	113	148	13	108	153	13	274
State		708	2390	10	243	2846	19	180	2903	25	3108

**Table-3.2      Conditions of Bund**

SI No	Name of District	Bund Condition			Total
		Good	Partially damaged	Seriously damaged	
1	2	3	4	5	6
1	Thiruvananthapuram	560	2	0	562
2	Kollam	170	14	0	184
3	Pathanamthitta	312	2	0	314
4	Alappuzha	54	321	33	408
5	Kottayam	190	0	0	190
6	Idukki	97	122	1	220
7	Ernakulam	162	10	0	172
8	Thrissur	107	5	1	113
9	Palakkad	0	245	0	245
10	Malappuram	219	5	0	224
11	Kozhikode	66	11	0	77
12	Kannur	120	5	0	125
13	Kasargod	225	49	0	274
State		2282	791	35	3108



**Table 3.3 Opinion of Cultivators in Scheme Area**

District	side walls of canals conserved		water level content in agricultural		level of soil erosion decreased	
	before SC work	after SC work	before SC work	after SC work	before SC work	after SC work
Thiruvananthapuram	50	422	321	509	4	419
Kollam	42	58	45	86	34	168
Pathanamthitta	15	57	132	163	9	58
Alappuzha	11	15	209	213	23	331
Kottayam	21	133	50	128	7	181
Idukki	3	14	206	208	4	206
Ernakulam	1	83	3	161	0	94
Thrissur	1	0	1	104	1	109
Palakkad	9	240	35	240	3	239
Malappuram	118	120	75	95	12	212
Kozhikode	0	0	34	34	0	2
Kannur	25	45	48	121	10	112
Kasargod	0	69	6	249	5	269

**Table 3.4 Opinion of Cultivators about the awareness of soil and water conservation schemes**

District	SCHEME	No. of Beneficiaries	awareness on soil & water conservation schemes	awareness watershed project	implemented schemes of soil and water conservation	satisfaction with the scheme implemented in own land
Thiruvananthapuram	Aroor Water Shed, RIDF-14	562	562	562	562	562
Kollam	Vadakodu watershed RIDF XVII	184	68	66	182	180
Pathanamthitta	vettoor watershed	314	119	137	312	312
Alappuzha	muttatimala watershed	408	338	396	405	403
Kottayam	Choomakkadu watershed	190	187	187	187	185
Idukki	Azhangad Meloram Watershed RIDF XIV	220	212	213	215	220
Ernakulam	Panapparathodu Watershed Project	172	165	165	162	126
Thrissur	Plachithoduncerthadapad hathi	113	113	113	113	112
Palakkad	Vazhakkaparavellapokka nivanapadhathi	245	240	215	172	188
Malappuram	Chekkunnu watershed RIDF X111	224	223	223	223	220
Kozhikode	Mavullachalil	77	63	65	38	40
Kannur	Madappurathidu watershed	125	125	125	59	59
Kasargod	Muttoamkadavu watershed project	274	260	245	203	197



**Table 3.5 Potentiality of Land in Scheme Area**

	Before SC work						After SC work					
District	cultivable land	Dryland	Soil Erosion	Rocky land	Marshy land	Non-cultivable land	cultivable land	Dryland	Soil Erosion	Rocky land	Marshy land	Non-cultivable land
Thiruvananthapuram	187	209	249	2	0	0	533	74	6	1	0	0
Kollam	119	85	179	61	0	37	141	63	56	61	0	36
Pathanamthitta	184	120	71	16	0	2	204	41	5	15	0	3
Alappuzha	400	212	374	2	1	1	403	198	340	2	1	1
Kottayam	15	133	177	20	0	6	78	88	39	11	1	6
Idukki	39	4	204	191	0	3	93	6	114	188	0	3
Ernakulam	101	73	111	11	0	5	163	24	2	10	1	1
Thrissur	112	112	113	0	0	0	112	5	2	0	0	0
Palakkad	244	245	243	0	0	0	245	244	2	0	0	0
Malappuram	156	189	220	167	1	2	155	155	8	161	0	2
Kozhikode	74	32	33	4	0	1	73	32	5	4	0	1
Kannur	62	0	124	32	0	0	125	0	3	30	0	0
Kasargod	34	223	264	122	3	14	65	136	6	76	2	3

**Table 3.6 Potentiality of Land in Control Plots**

District	cultivable land	Dryland	Soil Erosion	Rocky land	Marshy land	Non-cultivable land
Thiruvananthapuram	62	58	0	0	0	0
Kollam	2	0	35	31	0	0
Pathanamthitta	55	13	8	0	0	0
Alappuzha	82	52	69	0	1	0
Kottayam	8	31	35	9	2	2
Idukki	17	2	33	25	0	1
Ernakulam	29	13	25	0	0	0
Thrissur	23	19	23	0	0	0
Palakkad	49	49	1	0	0	0
Malappuram	49	42	35	49	0	0
Kozhikode	16	5	16	0	0	1
Kannur	7	4	25	18	0	0
Kasargod	43	51	52	25	0	0



**Table-3.7 Occupational Profile – Scheme Area**

SI No:	Name of District	Occupation				
		Agriculture	Non-Agriculture	Agriculture Labourers	Non-Agriculture Labourers	Total
1	Thiruvananthapuram	14	546	2	0	562
2	Kollam	88	40	28	28	184
3	Pathanamthitta	89	224	0	1	314
4	Alappuzha	35	234	57	82	408
5	Kottayam	65	99	18	8	190
6	Idukki	66	96	30	28	220
7	Ernakulam	56	78	18	20	172
8	Thrissur	46	67	0	0	113
9	Palakkad	58	120	15	52	245
10	Malappuram	99	117	8	0	224
11	Kozhikode	3	50	13	11	77
12	Kannur	21	21	52	31	125
13	Kasargod	194	45	31	4	274
State		834	1737	272	265	3108

**Table-3.8 Occupational Profile Control Plots**

SI No	Name of District	Occupation				
		Agriculture	Non-Agriculture	Agriculture Labourers	Non-Agriculture Labourers	Total
1	Thiruvananthapuram	0	15	7	90	112
2	Kollam	18	11	6	1	36
3	Pathanamthitta	12	34	1	16	63
4	Alappuzha	5	54	4	18	81
5	Kottayam	14	17	3	4	38
6	Idukki	19	16	6	3	44
7	Ernakulam	10	13	3	9	35
8	Thrissur	5	18	0	0	23
9	Palakkad	16	18	4	11	49
10	Malappuram	23	10	12	4	49
11	Kozhikode	1	9	1	5	16
12	Kannur	1	4	14	6	25
13	Kasargod	37	8	10	0	55
State		161	227	71	167	626



**Table-3.9 Non -Agricultural income of Beneficiaries in Scheme Area and Control plots**

District	CATTLE - FARMING		GOAT-REARING		POULTRY - FARMING	
	Before	After	Before	After	Before	After
<b>Thiruvananthapuram</b>	1522500	2022800	414000	644000	185000	268100
<b>Kollam</b>	339000	544200	90000	133500	47650	65600
<b>Pathanamthitta</b>	385050	475700	67550	75250	22400	27350
<b>Alappuzha</b>	175000	198000	43000	57000	31000	37000
<b>Kottayam</b>	183000	237500	7000	25500	12500	22000
<b>Idukki</b>	30102	39500	2300	3500	7600	7540
<b>Ernakulam</b>	375000	757000	37000	43000	59000	168000
<b>Thrissur</b>	47000	56000	15000	18000	14200	13100
<b>Palakkad</b>	769000	1080000	453000	636000	21800	21950
<b>Malappuram</b>	5394502	6101000	1117000	1036000	424000	441300
<b>Kozhikode</b>	14505	5005	94000	102500	2753	4104
<b>Kannur</b>	359000	525000	44000	64000	2500	10500
<b>Kasargod</b>	1218370	1371080	365160	409865	37555	41492

### **3.2 Occupational Profile**

The occupational profile of the selected beneficiaries reveals that 25.71.% included agriculture job, 36.26% are accounted as non-agriculture; . 11.34 % agricultural labourers and 26.68 % are categorized as non-agricultural labourers.

### **3.3 Summary of Findings**

The data furnished in this report are collected through the Evaluation study on soil conservation programmes conducted during 2017-18. The entire districts except Wayanad were covered in this study. . The methodology of this study was stratified



sampling method on the basis of the area of the holding. For the study purpose schemes implemented by the Soil Conservation Department and other Local Self Government were included. For the purpose of comparison control plots are also selected from the scheme area where the soil conservation works are not carried out under any scheme. In the light of the present study, an attempt is made for the cost benefit analysis with the collected data. Several benefits flow from the soil conservation programme implementation. Some of the findings of the study are given below:

For the study purpose 13 schemes were selected. The total number of beneficiaries comes to 3108, all beneficiaries were selected for the detailed study. Land use particulars of beneficiary plots give us certain positive trends while comparing with the area before and after the soil conservation programme

### ***3.4 Income and Expenditure***

The particulars relating to income and expenditure of beneficiary plots reveals that after implementation of SC programme net income of the beneficiaries of the scheme area increased . It is estimated that the percentage increase of net income per acre in beneficiary plots of the scheme area as 2.2%.

Analysis of data collected from the beneficiary and control plots reveals that the net income per acre, received from the beneficiary plot is Rs 65359.21. and from the control plot is Rs 50208.17. The district wise details are presented in Table No. 2.16 and 2.17 . The higher rate of income from the scheme area is due to the positive impact of soil conservation programme.



**Table-3.10 Cropping Intensity in Scheme Area**

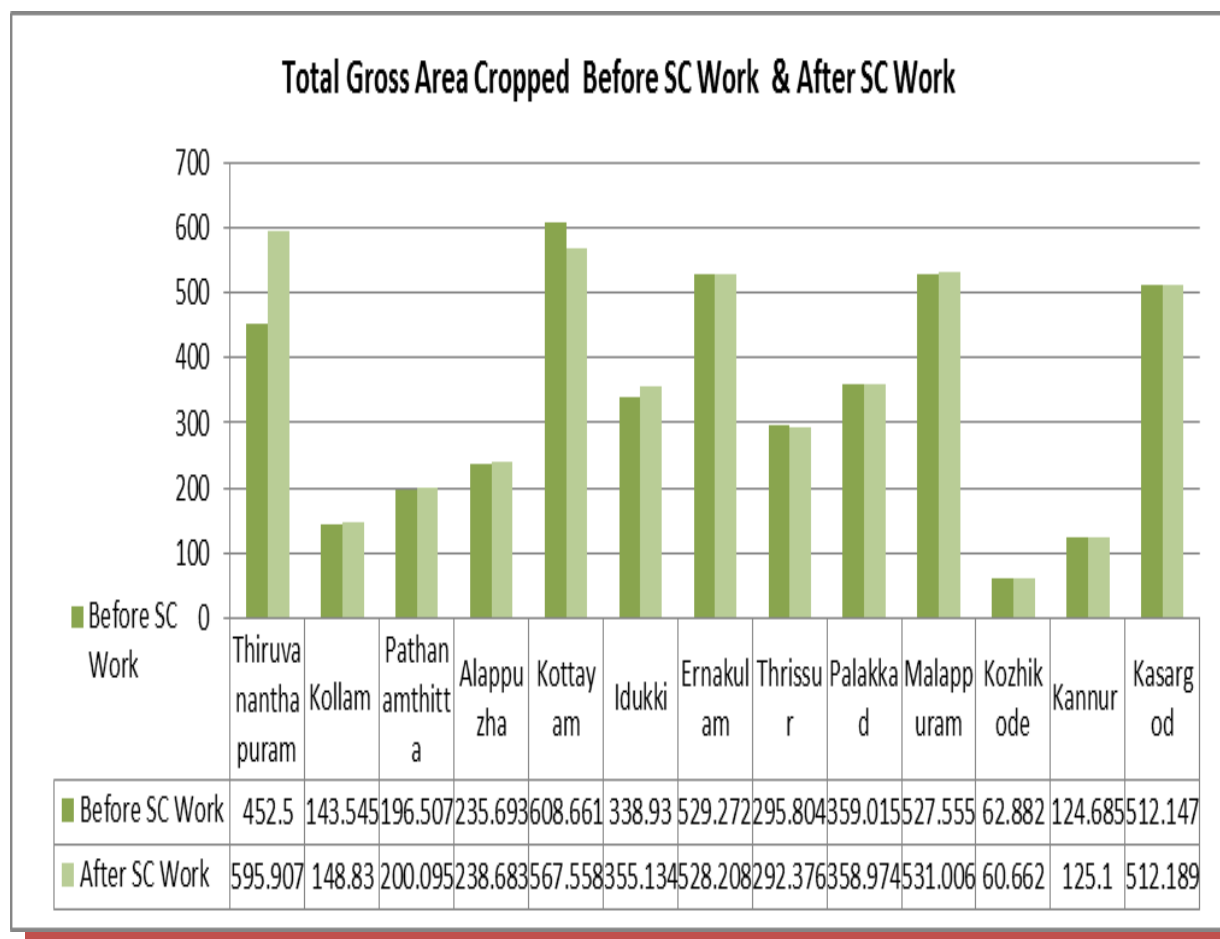
SI No	District	Net Area Cultivated		Total Gross Area Cropped		Intensity of Cropping (%)	
		Before SC Work	After SC Work	Before SC Work	After SC Work	Before SC Work	After SC Work
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	350.120	352.150	452.500	595.907	129.240	169.220
2	Kollam	150.580	151.060	143.545	148.830	95.330	98.520
3	Pathanamthitta	135.170	135.170	196.507	200.095	145.380	148.030
4	Alappuzha	255.660	255.170	235.693	238.683	92.190	93.540
5	Kottayam	274.859	273.959	608.661	567.558	221.440	207.170
6	Idukki	370.718	383.085	338.930	355.134	91.430	92.700
7	Ernakulam	128.690	128.490	529.272	528.208	411.280	411.090
8	Thrissur	344.470	338.630	295.804	292.376	85.870	86.340
9	Palakkad	182.630	182.630	359.015	358.974	196.580	196.560
10	Malappuram	321.910	323.760	527.555	531.006	163.880	164.010
11	Kozhikode	65.300	65.290	62.882	60.662	96.300	92.910
12	Kannur	155.780	155.780	124.685	125.100	80.040	80.310
13	Kasargod	512.740	512.740	512.147	512.189	99.880	99.890
State		3248.627	3257.914	4387.196	4514.722	135.048	138.577



### 3.5 Cropping Intensity

Productivity of the land to a certain extent influenced the cropping pattern of a locality. Through this study, it is seen that, the cropping intensity of the scheme is increased from 135.048% to 138.577%. District wise details are presented in table No.3.10

**Graph 3.1 Total Gross Area Cropped Before SC Work & After SC Work**





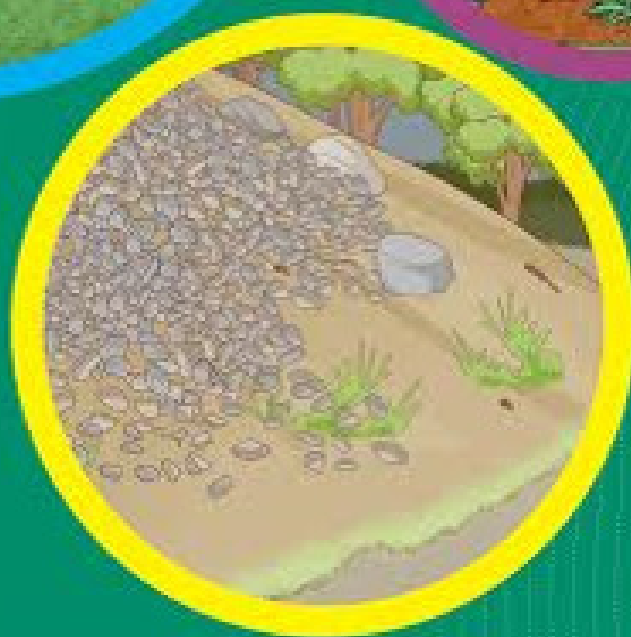
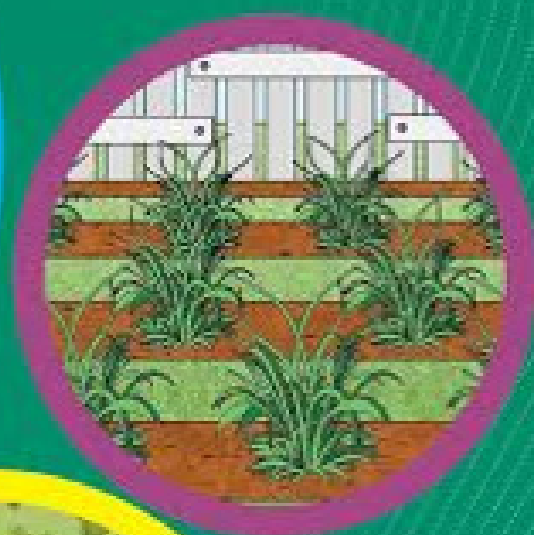
## **Conclusion**

The concepts of Watershed Management has been well recognized among the people in the scheme area. The effectiveness of the activities in the treated area should be analysed during the implementation and after the project. Evaluation study will be a solution to find the things and after effects of the scheme.

It is an important thing to be noted that whether it implies such an effective change of benefit is coming to the beneficiaries or not. A drastic and tremendous changes cannot be seen anywhere in the area of scheme.

Watershed Management implies the wise use of the soil, water and other bio-resources in a scheme area to obtain optimum production with minimum disturbance to the environment. As we know water and soil interdependent; both of them should be conserved through these schemes. For judicious utilization and development of all lands; the overall objective of Watershed programme includes recognition of Watershed as a basic unit. The land is to be treated according to the capability and requirement by adopting suitable scientific and adequate methods that will control soil erosion, to conserve water, improve the income from farming, to control floods and droughts etc.





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